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Colorectal Cancer QUERI

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Executive Summary

Mission Statement: The Colorectal Cancer QUERI mission is to promote the translation of research discoveries and innovations into patient care and systems improvements in order to reduce the incidence, late detection, suffering, and mortality from colorectal cancers among all veterans.

In 2004 CRC QUERI assessed lessons learned from ongoing projects and needs assessment data. We prioritized and focused our implementation pipeline. We have made great strides in translating research findings into clinical and management products as well as building relationships with operations and policy partners. Our implementation targets are more precisely defined – a direct result of our formative research efforts. During 2004, Research Coordinator Michelle van Ryn stepped down to focus on her own research. We are pleased that Michelle is continuing as an active QUERI-affiliated investigator. After extensive consultation with VACO and the Executive Committee, former Implementation Research Coordinator Laura Kochevar was appointed Research Coordinator. Co-Clinical Coordinators John Bond and Dawn Provenzale continue in their roles. Together, we look forward to advancing the CRC QUERI mission in 2005.

Ultimate success at achieving that mission is defined by creating measurable, sustainable improvements in colorectal cancer prevention, early detection, treatment, surveillance and patient-centered outcomes. Achieving the overarching QUERI goal of rapid and systematic health care improvement requires adherence to a more focused strategic pipeline of activities. The CRC QUERI pipeline features an applied focus on a critical clinical issue and simultaneous support for research and clinical partnerships to guide future transitions to other problem areas.

Colorectal cancers (CRC) rank third among causes of cancer deaths, account for approximately 10% of all new cancer cases, and are the third most common cancers among men and women in the U.S. The 5-year survival rate is 90% for people whose colorectal cancer is found and treated in Stage I and 9% for people with Stage IV disease. Only one third of colorectal cancers are found at an early stage, primarily due to low rates of screening and complete diagnostic evaluation (CDE). These facts persist despite the *strong evidence base* that colorectal cancer screening (CRCS), CDE and treatment, can substantially lower incidence and mortality rates.

The complete process of CRCS, CDE, and treatment is required for any benefit to occur. While the VA Office of Quality and Performance (OQP) reports that FY 2004 compliance with the CRCS performance measure averaged 74%, findings from CRC QUERI studies indicate that 54% of veterans with positive screening results fail to receive CDE within six months. Since

CDE rates are lower than screening rates, and screening is useless without CDE, **our first goal and implementation focus is to improve the rate of CDE following a positive initial screening test**. We have made significant progress toward developing an integrated, conceptually driven approach to improving CDE rates. A finite set of multifaceted interventions can

address a wide range of CDE issues and the QUERI is taking the necessary steps to move these interventions forward:

- We are translating lessons learned from preliminary research findings to a CDE performance monitoring and feedback system for regional and national use. This system will be presented to representatives from OQP and Patient Care Services (PCS) on March 1, 2005.
- We are developing active partnerships with policy, management and clinicians to address CDE issues and develop stakeholder buy-in. We have partnered with the National CMO/QMO working group on analysis of national CRC diagnostic practices and with the GI Field Advisory Committee to gather GI leadership opinions.
- We have begun a partnership with the National ACA Measurement Committee to improve monitoring of CRC diagnostic delay. We have consulted with Advanced Clinic Access workgroups in several VISNs that are working on solutions to this issue. CRC QUERI will integrate the lessons learned from these clinical partners into our implementation activities.
- We have implementation projects underway, and others submitted for funding review. These projects provide the evidence base and business case for critical CDE interventions: efforts to increase communication of screening results among patients, primary care, laboratory, and GI providers, efforts to improve and streamline referral processes, identify patients at risk for CDE non-completion, improve patient compliance with CDE prep, and improve patient adherence with CDE appointments.

Our second and third goals (**to reduce variation in, and improve CRC guideline-adherent screening rates** and **to improve the quality of cancer care and reduce suffering and mortality among CRC patients**) are discussed in the body of the report. Our primary activities in these areas were to coordinate and contribute to the research community that is developing knowledge and tools necessary for downstream implementation efforts. However, lessons learned from these efforts are already influencing our implementation strategy and producing usable tools. For example, early feedback from screening needs assessments show that decreasing morbidity and mortality through screening will require a two-fold approach: community health outreach to sporadic primary care users and investment in high-impact clinical tools. Lessons learned from the VA CanCORS study of cancer diagnosis and treatment practices are being used to develop performance monitoring tools and are actively informing the GPRA review effort, benefiting the VHA organization as a whole.

I.1 Clinical Focus and Scope

Our long-term mission is to promote the translation of research discoveries and innovations into patient care and systems improvements in order to reduce the incidence, late detection, suffering, and mortality from colorectal cancers among all veterans. The CRC QUERI has identified a critical performance gap in providing complete diagnostic evaluation (CDE) following positive CRC screening. Our current implementation focus is on producing measurable, rapid and sustainable reductions in this performance gap. The scope of research conducted by QUERI affiliates covers the entire continuum of detection and care represented by our mission statement. These research programs provide the foundation for a future shift in implementation focus.

I.2 Significance and Consequences

Colorectal cancers (CRC) rank third among causes of cancer deaths, account for approximately 10% of all new cancer cases, and are the third most common cancers among men and women in the U.S.[1] There are approximately 148,000 cases (107,300 colon and 41,000 rectal) each year (SEER 2002 estimate). About half of people with colorectal cancer will die from the disease due to tumor spread. Stage at diagnosis is the primary predictor of prognosis. The 5-year survival rate is over 90% for people whose colorectal cancer is found and treated in Stage I[2] as compared to 9% for people with Stage IV disease.[1] Unfortunately, only one third of colorectal cancers are found at an early stage,[3] in large part due to low rates of screening and diagnostic follow up. Although data from the National Health Interview System has shown gradual and modest increases in the use of screening procedures for colorectal cancer from 1987 to 1998, such increases are unequally distributed in the population with African Americans at greatest disadvantage.[4, 5] The highest colorectal cancer incidence rates are found in African Americans, followed by whites and Asian/Pacific Islanders. American Indians, Alaska natives, and Hispanics have the lowest colorectal cancer rates.

Deaths from colorectal cancers are estimated at 56,700 per year, shortening life expectancy on average by approximately 13 years in those who die of CRC.[6] A person at age 50 has about a 5 percent lifetime risk of being diagnosed with colorectal cancer and a 2.5 percent chance of dying from it.[7] Colorectal cancer has a significant economic impact on health care systems, patients, families, and society. The total costs attributed to CRC in the US range from 5.5-6.6 billion, with 80% of these due to inpatient medical care costs, making CRC among the costliest cancers to treat.[8-10] Indirect costs such as losses in time and economic productivity resulting from cancer-related illness and death, and intangible costs in pain and suffering, are difficult to over-state. Despite advances in supportive and palliative care, CRC continues to

cause devastating suffering due to pain, depression, loss of functioning, and fatigue. Furthermore, the physical, social, and emotional impact of caring for a cancer patient can have a significant deleterious effect on caregivers and other family members. [4, 5, 11-31]

I.3 Treatment/Management Evidence base for Colorectal Cancer Screening (CRCS), Complete Diagnostic Evaluation (CDE) and Recommended Treatment (RT).

Screening/Early Detection. There is a *strong evidence base* for the finding that CRCS, followed by diagnostic imaging CDE of patients with positive screening results can reduce mortality from, and incidence of, colorectal cancer when prompt initiation of RT follows diagnosis.[2, 32-37] Each step in this process (CRCS, CDE, and RT) must be in place or there is no benefit to screening, thus all efficacy studies of CRCS presume appropriate use of CDE and RT in their protocols.[2, 32-37] The evidence regarding choice of specific CRCS modality, timing and choice of CDE modality, and empirical evidence in support of current RT are less complete. Nevertheless, there is a high degree of consensus among professional organizations in their guidelines (provided in Appendix 1). Screening Modality: The USPSTF cites insufficient evidence to prefer any screening modality over another on the basis of efficacy, cost-effectiveness, or safety. Likewise, the VA preventive care performance measure and the official standard of care for the VHA (VA National Cancer Directive, 2003) supports the use of fecal occult blood test, flexible sigmoidoscopy, or direct screening colonoscopy (DSC) for CRCS. Extensive work conducted by the CRC QUERI Clinical Coordinators and others provide strong evidence for the efficacy and cost effectiveness of the colorectal cancer screening process for early detection and prevention of colorectal cancer death.[2, 7, 33, 34, 36-48] Good quality evidence from 3 randomized trials shows that a screening process initiated by a **fecal occult blood test (FOBT)** reduces mortality from colon cancer by 18%. [2, 42, 49] Evidence from randomized trial and case-control studies support the efficacy of a screening process initiated by **flexible sigmoidoscopy (FS).**[50-54] In contrast, the evidence in support of **double contrast barium enema (DCBE)** as a screening or diagnostic tool is fair, at best, and indicates DCBE may have low sensitivity for detection of polyps.[55] There is good evidence of DSC's efficacy at finding precancerous polyps.[36, 45, 56-58] However, the effect of widespread adoption of DSC on overall screening *rates* is unknown. Other screening modalities continue to be developed but there are insufficient data to recommend any of these options at present.[47]

The evidence base for Colon and Rectal Cancer Treatment is uneven and difficult to characterize since it varies by stage, treatment goals (cure or palliation) and other clinical factors (e.g., location of malignancy, effect on symptoms and functioning). Since a full review is beyond the scope of this report, we review the basic evidence below. Interested readers may

wish to refer to Appendix Two, which provides a review of the evidence as well as NCI's *Colon Cancer (PDQ®): Treatment*.

Treatment. There have been few randomized trials testing the stage-specific benefit of a given treatment over another, resulting in huge gaps in our knowledge. **Surgery** for early stage CRC is the standard of practice and often curative. The number of case studies indicating that local recurrence of cancer is much lower with complete resection with no residual tumor renders a randomized trial unethical. The use of surgery in metastatic CRC is unclear, controversial, and (in the absence of uncontrolled bleeding or obstruction) hotly debated. **Radiation** is recommended for Stage II and III rectal cancer based on case study evidence. Similarly, there is some evidence that the use of preoperative radiation reduces local recurrence and complication rates. Timing of surgery and radiation is controversial for rectal cancer. Two randomized, non-blinded control clinical trials showed that surgical therapy along with adjuvant **chemotherapy** with postoperative Levamisole or 5-FU-Levamisole showed significant improvement in disease-free survival for patients with Stage III colon cancer vs. surgery alone, but overall survival benefits were borderline statistical significance. Currently, assessment gaps between best and current practice rely on standards of care for stage-specific treatment of colon and rectal cancers established by expert consensus.

Pain, Supportive Care, and Palliation. The evidence base for treatments intended to reduce the suffering associated with CRC and its treatments is also variable. The World Health Organization developed a widely accepted analgesic ladder for titration of pain medications in cancer patients and its effectiveness has been documented in large case series. This provides a starting point for evaluating quality of pain control; however, it does not provide for matching the options for cancer pain control with individual needs, preferences, and likely responses. VA has established a strong performance measure for conducting pain assessment, although the best methods for assessment remain unclear. There have been very few controlled clinical trials of treatment for cancer-related fatigue and of these the treatments are rarely supported. However, most of these trials had small sample sizes and so may have been underpowered to detect effects. Positive outcomes have also been reported for a variety of psychosocial interventions and exercise, although the lack of methodologically strong randomized trials and/or replication of an approach weakens these findings.

Cancer communication and shared decision-making has been associated with patient satisfaction and adherence. Although much discussed, there is little definitive evidence regarding what makes a difference in cancer care. We believe that decision aids may be useful

as there is good evidence that decision aids are helpful in other contexts. However, there have been few tests in cancer care with power sufficient to detect effects.

I.4 Current Practices and Quality/Outcome Gaps

Primary Prevention: Due to the unclear cost/benefit ratio of promoting any given risk or protective factor, we are not focusing on primary prevention at this time.

Secondary Prevention and Early Detection (CRCS and CDE): According to EPRP findings for FY 2004, the CRCS performance measure averaged 74%, ranging from 65% to 80% at the VISN level and 46% to 100% at the facility level for veterans consistently utilizing VA primary care. Recent VA data show that 48% of veterans diagnosed with colorectal cancer were not screened, but presented with signs and symptoms[1]. The most powerful predictor of CRC screening and stage of diagnosis within the VA is frequency of primary care utilization[60,77]. Furthermore, the mean time from initial eligibility for CRCS and compliance within the VA is 2.4 years[2]. Together, these data indicate that successful reduction of CRC morbidity and mortality within the VA will require a binary strategy: 1) using a community health approach to reach out to veterans who use the VA system, but use VA primary care sporadically and 2) developing tools to help clinics, providers and patients attain compliance with limited (e.g. single visit) exposure to the concept of CRC screening.

Analysis of FY 2002 EPRP data completed by CRC QUERI researchers[59] indicate that, overall, 54% of veterans with positive FOBT results fail to receive CDE within six months. Of these, 40% are not referred for follow-up while 14% are referred but do not complete the exam. Female and African American veterans were less likely to receive CRCS while older, higher income, higher utilization veterans were more likely to receive CRCS. DSS estimates mean wait time for endoscopic clinic appointments at 83.1 days, but Fisher and colleagues[60] estimate mean time to actual CDE completion is 276 days. Data from 3 of the 4 CRC SAFE sites indicate CDE referral failure in 65%, 60%, and 25% of veterans. These same sites experience CDE appointment completion gaps of 15%, 20%, and 56% respectively. While the net CDE rate in these facilities is comparable (28%, 32% and 34%) these sites clearly have different intervention needs: programs directed at increasing referral rates in the first two sites and appointment completion in the third. Work by Kochevar and colleagues revealed that a primary predictor of efficient endoscopic resource utilization is appointment adherence. Based on preliminary data, Dr. Kochevar estimates that a modest 4% absolute increase in appointment

[1] Unpublished chart review findings from the CMO workgroup on colorectal cancer, technical assistance provided by CRC QUERI.
[2] Data from CRC-SAFE data system, extracted from VistA, Austin and Medicare datasets.

adherence may support up to a 25% increase in colonoscopy (CS) capacity without affecting capacity to perform other endoscopic procedures.

CRC Treatment: The National Cancer Policy Board of the Institute of Medicine recently concluded that "for many Americans with cancer, there is a wide gulf between what could be construed as the ideal and the reality of their experience with cancer care."[61] Nationally, the treatment and outcomes of colorectal cancer vary widely by key patient characteristics, such as race or age, and among different types of providers,[62-68] but the reasons for these differences are not well defined. Little is known about CRC treatment variations within the VA.

Supportive and Palliative Care: Little is known about variations in palliative and supportive care in VA. In general, there is considerable evidence that cancer pain is under-treated, largely due to inadequate assessment.[69, 70] Furthermore, there is considerable evidence of significant race/ethnicity disparities in pain treatment.[71-75]

End-of-Life Care: This is a crosscutting issue, and is highly relevant for a significant percentage of patients with CRC. This will be an important area of future research.

I.5 Significant Influence on Current Clinical Practices and Outcomes
VHA programs:

Clinical Practice Guidelines Council: CRC EC Helfand is a member of the VA CPGC and the performance monitoring subcommittee.

Office of Quality and Performance: CRC QUERI will be presenting findings and methods from the CRC-SAFE and CanCORS projects to OQP leadership March 1, 2005. The goal of the meeting is to work toward a closer partnership in improving CRC diagnosis through performance monitoring. We plan to invite a representative from OQP to join the QUERI Executive Committee.

Acute Care Strategic Health Group Oncology Program: Newly recruited CRC EC Patel is the director of the SHG Oncology Program.

VA GI Field Advisory Committee: CRC ECs Bond and Provenzale are members of the GI FAC. QUERI has also provided technical support to the GI FAC's leadership opinion survey.

GI Endoscopy Advance Clinic Access (ACA) workgroups: The goal of the GI ACA is to reduce GI endoscopy wait times by managing clinic supply and demand. The ACA groups have the ability to enact rapid clinical change; yet they are frequently in need of needs assessment and evaluation support. To date, CRC QUERI has provided consultation to with several VISN and Facility GI ACA groups. We are partnering with the National ACA Measurement Committee to improve monitoring of CDE delay.

Oncology Program Evaluation Team (Oncology GPRA): The Oncology GPRA is charged with developing a plan for independent (non-VA) evaluation of VA oncology clinical practices. The

CRC QUERI has shared its information and plans with this group and Co-Clinical Coordinator Dawn Provenzale is a member of the steering committee.

VA Central Cancer Registry: In collaboration with VIReC representatives Hynes and Perrin, CRC ECs Dominitz, Provenzale, and Kochevar have recently received funding for an evaluation of the VA Central Cancer Registry. The data provided by the registry are essential for monitoring quality of care and progress toward early detection and prevention. We continue to work with the registrar to resolve privacy and legal issues

National CMO Workgroup: This group of VISN CMO's conducted a needs assessment survey and chart review of CRCS and CDE practices. The CRC QUERI provided analysis and interpretation of these data. Mark Enderle, VISN 16 CMO has been appointed liaison to the CRC QUERI. We have asked Dr. Enderle to join the CRC Executive Committee and he has tentatively agreed.

National Center for Health Promotion and Disease Prevention (NCP): CRC QUERI is discussing partnership opportunities for screening promotion interventions with NCP. We plan to add an NCP representative to the CRC QUERI Executive Committee and have asked NCP to nominate that representative.

Non-VA Programs:

NCI: NCI has co-funded CRC QUERI during its formative period and the EC has an ongoing dialogue with NCI leadership.

Quality Cancer Care Consortium (QCCC): CRC ECs van Ryn and Kochevar have participated in the activities of the Quality Cancer Care Consortium, led by NCI.

Professional Societies: CRC QUERI ECs Bond and Provenzale, and affiliate investigator Imperiale, are leaders in national professional societies including the American College of Gastroenterology, the American Gastroenterological Association and the American Cancer Society.

I.6 CRC QUERI Goals

1) Our top priority is to improve the completion rate and reduce wait times for CDE following a positive FOBT, FS, or DCBE. Objectives include:
    a. Facilitate development of performance monitoring and feedback systems for CDE. We will be presenting specific recommendations for this system to representatives of OQP and PCS on March 1, 2005.
    b. Improve referral rates for CDE. Our recommendations for CDE performance monitoring include referral rates and referral delay. We are developing and testing an electronic notification system to facilitate referrals and are working with Advance Clinic Access groups to understand how leading facilities manage the referral and consult process between primary care and GI.
    c. Improve appointment adherence for CDE. Missed appointments are the major cause of delay of CDE in the VA. Our proposed implementation of an interactive voice response-delivered intervention includes patient-directed reminders and educational and motivational components to improve appointment adherence.
    d. Decrease late cancellations for CDE appointments. Late cancellations produce long wait times and are related to decreased completion of CDE throughout the VA. Decreasing late cancellations is vital to increasing CDE throughput without increasing staffing. Our proposed implementation of an interactive voice response-delivered includes a module to facilitate scheduling and reduce late cancellations.
    e. Improve patient preparation for colonoscopy. We have several projects that examine patient and provider perceptions of colonoscopy prep and needs of special populations, such as those with low health literacy. QUERI affiliate Imperiale is developing an informatics support system to facilitate the use of Phos-soda prep. While Phos-soda is preferred over PEG prep by many patients, it is currently used in only 42% of VA clinics due to concerns that patients with renal failure or electrolyte imbalance may be at risk for side effects. Our proposed IVR-delivered intervention includes education, motivation, and support materials to help patients complete their prep.
    f. Identify and implement other promising interventions with a strong evidence base of significant effect on the identified causes.
2) Reduce variation in CRC screening rates. Objectives include:
    a. Continue our efforts to identify the organizational, provider, and patient factors that inhibit and promote guideline-adherent screening.

b. Develop and test new strategies and adapt existing strategies for addressing such causes/barriers.
c. Improve communication and shared decision-making regarding screening.
d. Test shared decision-making tools that have been shown effective in other settings.
e. Continue to identify and implement existing interventions with a strong evidence base for improving CRC screening.

3) Improve the quality of cancer care and reduce suffering and mortality among CRC patients in VA. Objectives include:
   a. Improve the evidence base on best practices (4-5 year objective).
   b. Identify gaps between current CRC treatment, supportive and palliative care and currently established standards of practice with early emphasis on surgical care, variation in pain treatment, provider-patient/family communication, and shared decision-making.
      i. Identify determinants of such gaps.
      ii. Implement interventions with a strong evidence base for addressing such determinants.
   c. Develop and test new strategies for improving adherence to guidelines or standards of practice.
   d. In later years, apply results of VA CanCORS to determine targeted interventions to improve CRC care.

I.7 Plans for Achieving QUERI Center Goals

In addition to the specific objectives listed above, we apply a number of global strategies in working to achieve CRC QUERI goals. Seven strategies are highlighted here, along with examples of the tactics associated with each strategy.

1) Our goals and implementation pipeline are tightly tied to the CRC screening, diagnosis and treatment process. This is depicted in Figure 1. There is a logical dependence among the phases of the CRC process. CDE has been identified as a limiting performance gap and assigned the highest priority. Figure 1 shows the leading-edge implementation status of our projects focused on CDE improvement and a full pipeline to sustain future implementation efforts related to other goals. Each QUERI goal is associated with at least one “core” project, led by a QUERI Coordinator or Executive Committee member (shown in darker colors in Figure 1). Note that the core projects associated with screening also address CDE issues and are placed between screening and CDE in Figure 1. These projects are central to focusing QUERI implementation efforts, provide feedback to strategic planning, identify

root causes of performance gaps and implement system change. Other projects are initiated by QUERI research affiliates (lighter colors in Figure 1). These projects are valuable to the QUERI as sources of information about cutting-edge best practices and evidence-based interventions. QUERI leadership regularly communicates with affiliates individually and through special interest subcommittees to monitor the status of these projects and build a sense of community among VA colorectal cancer researchers. CRC QUERI also conducts projects in response to stakeholder requests (shown with a bold outline in Figure 1). These projects are critical to developing stakeholder buy-in, gaining an understanding of stakeholder perspectives, and often inform other QUERI priorities.

2) Partnerships with key stakeholder groups are becoming a more important strategy for CRC QUERI, as depicted in Figure 2. This figure depicts the relationship between stakeholders and key CRC QUERI projects. Solid lines indicate partnerships that are currently in place such as the contribution of CanCORS to the GPRA review. Dotted lines indicate potential partnerships that are currently under discussion, such as the roll out of findings from CRC-SAFE and CanCORS to OQP.
3) We use an integrated, rigorous, conceptually driven approach to guide our activities. Figure 3 illustrates our overarching conceptual model. We are guided by an integration of social ecological perspective and a systems approach. Within this framework implementation is guided by an understanding of contextual factors and interactions among stakeholders. As demonstrated by the results of our CDE formative work, the underlying causes of performance gaps can differ dramatically across contexts. However, the set of core issues is typically finite and tractable. Many implementation barriers are most effectively identified and resolved through an iterative process of implementation and formative evaluation. However, implementation of interventions that proceed in advance of a basic understanding of variability of the problem, and the way key limiting factors influence the problem, ultimately slows progress and sustainable improvement. Accordingly, we continue to work to balance the need for rapid response with the development of a diagnosis plan sufficient to support sustainable implementation efforts. The recent paper contributed to the Implementation State of Art Conference by Kochevar and Yano[76] (under review for the Journal of General Internal Medicine) details many of the lessons learned through this balancing process. Example of practical tactics for implementing this approach include:
    a. Conducting task analysis and global diagnoses using extensive VA data resources, key informant interviews, and networking with diverse national policy and operations partners.

b. Conducting detailed diagnosis through pilot implementation and formative evaluation, developing and testing interventions in sites that represent the types of problem variants identified through global diagnosis.
c. Examining the utility and feasibility of national roll-out of diagnosis, surveillance, and intervention approaches that demonstrate success in these "lab" sites.

4) We leverage core funds to support pilot, diagnostic, and formative studies that are either: 1) needed to inform larger grant proposals or 2) helpful in answering questions where the need for rapid response outweighs the precision gained through a heavily funded approach. Examples of tactics include:
    a. Providing salary support on the CRC QUERI core budget when the Center's (CCDOR) existing staff have the expertise needed to conduct a priority project in response to stakeholder demand. Thus, the core budget includes salary support for programmers and statisticians equal to the time needed (as one example, to analyze administrative databases for variation in CDE show and completion rates),
    b. Providing small locally initiated project grant funds to priority projects such as contracting with qualitative interviewing experts to collect data on clinic management norms and practices. These data are used to supplement analyses of administrative data and to select sites for pilot testing and survey sampling.
5) Promote the application of preliminary research findings and methods to refining the strategic and implementation plans and creative integration of data across projects. For example, early cross-study CDE findings were used to move aggressively on seeking funding to alleviate patient adherence issues. Early CRC-SAFE findings and those from our partnership with the CMO workgroup has also directed our strategic approach to CRC screening issues to include community health interventions as well as traditional health system interventions. Cross-study preliminary findings relating to health disparities are being integrated to develop new programs. We believe that it is especially important to note that advances in research <u>methodology</u> need to be translated to clinical/management products as much as research findings. For example, CanCORS findings on treatment practices are not yet available, but the CRC QUERI is moving ahead to reap the benefits of the National CanCORS Consortium design team. We are combining CanCORS lessons learned about chart review of critical data elements with CRC-SAFE lessons learned about VA data systems to develop performance monitoring tools.

6) We work very hard to develop and maintain a national network of investigators interested in the continuum of CRC control from prevention through end of life care. Tactics include:
    a. Identifying and reaching out to existing CRC researchers,
    b. Providing technical assistance, and
    c. Attempting to foster a sense of inclusion, for example by inviting affiliated investigators to participate in a portion of our EC meetings and by the formation of special interest subcommittees.
7) In order to improve our decision-making efficiency, we have appointed a CRC QUERI Leadership Group comprised of senior members of the EC who:
    a. Have a primary appointment in the VA, and
    b. Are leaders in colorectal cancer related research and/or clinical activities (Bond, Helfand, Kochevar, Provenzale, Yano).

I.8 Summary of Changes Since Last Year

1) Michelle van Ryn stepped down as Research Coordinator in July, succeeded by Hanna Bloomfield as Acting Research Coordinator. The CRC QUERI used this interim period to work with its Executive Committee and HSR&D Associate Director/QUERI Program Director Joe Francis to review its strategic plan and performance to date. As a result of this process our strategic plan is more action-oriented and there is a greater emphasis on partnerships with stakeholders. In September, 2004 Laura Kochevar (former Implementation Research Coordinator) was named Research Coordinator. Dr. Kochevar has worked closely with the Executive Committee, research affiliates and stakeholder groups to develop the implementation arm of the strategic plan. As such, she brings vital experience to bear as the CRC QUERI transitions from formative to implementation-focused activities.
2) The Implementation Research Coordinator position is currently vacant. Recruitment for this position is ongoing and is our highest administrative priority. Implementation associate Nancy Koets is helping with IRC responsibilities during recruitment.
3) Suzanne Leger has been appointed Administrative Coordinator.
4) A Co-Clinical Coordinating Center has been established at the Durham VAMC, led by Dawn Provenzale. The focus of this center is the coordination of our CRC treatment arm of the strategic plan. The Minneapolis Co-Clinical Coordinating Center, under the direction of John Bond, remains focused on CRC screening and CDE.
5) We have stepped up our recruitment of clinical, management and policy partners. T.G.Patel, director of the Acute Care SHG Oncology Program has joined the QUERI Executive

Committee. We are recruiting additional EC members from OQP, the CMO workgroup and the National Center for Health Promotion and Disease Prevention.

6) We are increasing our technical assistance to operations partners. For example, we assisted the PCS Technology Assessment Program in producing a review of the role of mid-level practitioners in CDE and CRCS, we have offered assistance to the OIG in its analysis of CDE delay, we are discussing QUERI involvement in evaluation of the new iMed consent initiative with representatives of the National Center for Ethics.

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II.1 Overview

The Colorectal Cancer QUERI Center has made substantial progress in achieving its mission during the previous year. The Center's primary impacts and contributions are listed in Table 1, and highlights are briefly described in the accompanying text.

II.2 Impacts, Contributions, and Products

We have advanced our mission in several ways:

- We have identified a relatively small set of interventions that can be used to improve CDE rates and reduce delay. Together, these interventions act on key barriers identified throughout the VA. As they become available they will be rolled out to facilities in need of the specific type of support. The intervention set is (in order of expected availability):
  - Performance monitoring and feedback
  - Informatics support for referrals and consults
  - System support for patient education and reminders to improve scheduling, colonoscopy prep and appointment attendance
  - Informatics support for Phos-soda colonoscopy prep
- We have translated early experiences from the VA CanCORS study to develop a performance monitoring tool for diagnosis of CRC from symptoms and initiation of treatment. These tools will be presented to representatives of OQP and PCS March 1, 2005.
- We are making a substantial contribution to VA clinical and managerial policy through our contributions to committees and councils associated with CRC.
- We are making a substantial contribution to national policy, and the VA national leadership role, by participation in non-VA committees, councils, and professional societies.
- We are developing active consulting relationships with clinical quality improvement agents within the VA, including Advance Clinic Access workgroups, VISN CMO's, and local endoscopy and GI clinical leaders.

Table 1. Impacts, Contributions and Products

Description	Project Label and Center (Goal)
IMPACTS	
Process-of-care / performance improvements	
Efforts are underway to improve diagnostic colonoscopy referral rates, completion rates, and primary care and GI provider satisfaction using an automated event notification system. Portland VAMC and 4 other demonstration sites (to be selected by randomization). The pilot event notification system has been deployed at the Portland VAMC.	CRC SDP **(1)**
A translation diagnosis/intervention targeting study is underway based on prior findings from national administrative data. We are interviewing key clinical and management personnel from facilities that are highly efficient in providing CDE to understand successful clinical processes and personnel from poorly performing facilities to understand barriers to effective practice. These interviews will lead to concrete actionable recommendations to improve practice throughout the VA.	Key Informant **(1)**
Primary care and GI providers at the Minneapolis VAMC have been engaged in a structured dialogue on the perceived advantages, disadvantages, barriers, and facilitators to using colonoscopy as a primary CRC screening method. This study is in response to actions taken by the GI field advisory panel and reported patient demand for the procedure. CRC QUERI does not endorse or promote any specific screening modality, other than supporting and disseminating the USPSTF guidelines that annual FOBT, flexible sigmoidoscopy or barium enema at five-year intervals, or colonoscopy once every ten years are acceptable screening tests. Currently, there is no evidence base to recommend screening colonoscopy as a preferred screening modality, but the necessary studies are underway. Understanding the barriers to screening colonoscopy will help us understand barriers to CDE, educate providers and patients about the acceptability of other screening modalities, and help us prepare for system changes that may be necessitated by changes in the evidence base.	DSC **(1,2)**
Risk factors for non-completion of CDE have been identified, allowing us to target interventions to patients with the greatest need. These risk factors include: patients who are fearful of the procedure; who absolutely cannot drink the required amount of PEG (possibly because of stomach motility disorders, diabetes, multiple sclerosis, etc.); who have low levels of education and thus possibly poor understanding of human anatomy; who are mentally ill; who are drug dependent; who have no social support system (spouse, housemates, partner) to assist them; who have a history of non-adherence.	DSC, Endo2 **(1)**
We have converted methodological findings from the CRC-SAFE data system and CanCORS consortium to performance monitoring tools. Together, these tools allow for monitoring the entire colorectal cancer screening, diagnosis and treatment process. These tools are being presented to OQP and PCS on March 1 with a goal of negotiating a phase III/IV regional or national implementation demonstration (CRC-SAFE II).	CRC-SAFE, CanCORS **(1,2,3)**

Description	Project Label and Center (Goal)
Morbidity performance improvements	
Mortality performance improvements	
Quality of life improvements	
Cost/utilization savings	
Based on modeling the cost of missed appointments, we expect our colonoscopy process improvement programs will produce significant cost reductions. Econometric analyses are included in these evaluations.	**(1)**
Other patient and system impacts	
CONTRIBUTIONS	
Contributions to VHA activities/entities	
CRC executive committee members and affiliated researchers are active in the following medical care activities: • **VA National Clinical Practice Guideline Council** (Helfand) • **VA OQP Performance Measurement Committee** (Helfand) • **VA GI Field Advisory Committee** (Bond, Provenzale) • **Puget Sound VAMC Cancer Care Committee** (Dominitz) • **GPRA Oncology Review Steering Committee** (Provenzale) • Quality Cancer Care Committee (Kochevar) – a consortium of federal agencies involved in improving cancer care (e.g. HERSA, CDC, NCI, IHS, NIH, DOD, VA) • American Gastroenterological Associations Clinical Practice Committee (Dominitz) • NIH/National Institutes of Diabetes, Digestive and Kidney Diseases Special Emphasis Panel (Douglas	Core **(1-3)** (Contributions to national and regional efforts have been included because we believe that representing the VA on a national level IS a VA service

Description	Project Label and Center (Goal)
Nelson, MD) • Chair, Multi-Society Task Force on Infection Control in Endoscopy, American Society for Gastrointestinal Endoscopy 2004-5 (Doug Nelson, MD) • Cochrane Collaborative Colorectal Cancer Group, establishing the evidence base for CRC screening and treatment (Baxter) • Texas Cancer Council, Action Plan on Colorectal Cancer for Texas, Steering Committee, Member (Vernon) • Participant: Describing Death in America. Institute of Medicine (Virnig) • Centers for Disease Control and Prevention External Stakeholder Advisor (2004): Development Of A Framework For A Colorectal Cancer Screening Initiative With An Evaluation Component, External Stakeholders Meeting. Centers For Disease Control And Prevention Atlanta, GA, August 26, 2004 (Kochevar).	activity. Also, these efforts allow the VA to benefit from lessons learned by other organizations.) VA-specific service activities are bolded.
Consultation efforts	
Authored the evidence-based evaluation of colorectal cancer screening for the American College of Physicians PEIR program (Baxter).	Core **(2)**
Member, Technical Advisory Board Member for VA-HCFA Data Merge Initiative (Virnig).	Core **(1-3)**
Technical Assistance to CMO/QMO workgroup on colorectal cancer screening and diagnosis (Kochevar)	CMO **(1-3)**
Technical Assistance to GI FAC leadership opinion survey (Kochevar)	GI FAC **(1,2)**
Other contributions	
• Background paper: “Understanding Health Care Organization Needs and Context: Beyond Performance Gaps” provided for VA HSR&D State of the Art Conference on Implementation Research (Kochevar and Yano) • Background paper: Models, Strategies and Tools: A Potential Role of Theory in Implementing Evidence-Based Findings into Practice in Organizational Settings provided for VA HSR&D State of the Art Conference	Core **(1-3)**

Description	Project Label and Center (Goal)
on Implementation Research (Kochevar, with A.E. Sales and J. Smith) • Chapter for the QUERI Guide to Implementation Research: Diagnosis and intervention targeting http://www.hsrd.research.va.gov/queri/implementation/ (Kochevar with H. Hagedorn) • Planning Committee for International Open Access On-line Implementation Research Journal (Kochevar)	
CLINICAL PRACTICE PRODUCTS	
Clinician education materials	
Numerous articles targeting journals widely read by practitioners (see table 2).	Core **(1-3)**
Web page.	Core **(1-3)**
Patient education materials	
Videotape promoting CRC screening education and shared decision-making – videotape developed, needs further testing for effectiveness in VA population subgroups.	Core **(2)**
Other clinical practice support tools	
The CRC-Screening and follow-up event data system (CRC SAFE) allows us to provide feedback to providers concerning their patient's adherence to CRC screening and diagnostic follow-up guidelines. The system is available in West LA, Portland, Durham and Minneapolis.	CRC SAFE **(1,2)**
Numerous articles targeting journals widely read by practitioners (see table 2).	
RESEARCH PRODUCTS	
Findings	
The major predictors of efficient endoscopic resource utilization in the VA are appointment adherence and facility population size.	CRC Endo 1 **(1)**
The major organizational predictors of CRCS in the VA are clinical support, provider mix, and facility population size.	Org CRC **(2)**
48% of VA CRC cases present with signs and symptoms rather than through screening. Staffing shortages are perceived as the major rate-limiting factor in provision of prompt CDE, despite empirical evidence that patient adherence is the principal driver of low CDE rates and clinic wait times.	CMO **(1)**
The major determinant of late-stage CRC diagnosis in the VA is the lack of a usual source of care.	ACG GI

Description	Project Label and Center (Goal)
	(1, 2)
Nationally, VA referral gaps for CDE are more pronounced than failure to complete CDE.	Org CRC **(1)**
VA facilities differ in whether their principal CDE barrier is referral or completion.	CRC SAFE **(1)**
Women were less likely to have had CDE initiated than men (adjusted odds, 0.66; confidence interval, 0.44 to 0.97). Physician survey responses indicating intermediate or high intention to evaluate a FOBT+ patient with a CDE were associated with nearly 2-fold greater adjusted odds of actually initiating a CDE in this circumstance versus physicians with a low intention. Factors accounting for nonperformance of a complete diagnostic evaluation were classified as follows: primary care physician decision (50%); specialist decision (28%); patient decision (17%); and other (practice-related) (5%). Many failures to complete an appropriate diagnostic evaluation were due to providers deciding to repeat the FOBT, perform a sigmoidoscopy, or not to proceed with any further testing. (non-VA study).	CRC DE **(1)**
Colorectal cancer screening using annual FOBT, flexible sigmoidoscopy at 3 or 5 years, the combination of FOBT and flexible sigmoidoscopy, barium enema, colonoscopy, and even virtual colonoscopy had incremental cost-effectiveness ratios ranging from $6300 to $92,900 per LY saved with most of the cost-effectiveness ratio ranging from $10,000 to $40,000 per LY saved.	Cost Utility **(2)**
Primary screening colonoscopy was performed in a cohort of 3196 asymptomatic subjects. A "good" preparation was reported in 81% of patients, and colonoscopy to the cecum was successful in 97.2% of cases. Mean insertion time to the cecum and total procedure times were 10.5 (8.7) and 30.6 (19.1) minutes, respectively. No preprocedural patient characteristics were identified that were predictive of an incomplete procedure. At least one polyp was resected in 1672 patients. There was no perforation and no death attributed to colonoscopy. Major morbidity considered to be definitely related to colonoscopy occurred in 9 of 3196 procedures (0.3%): lower GI bleeding requiring intervention (6), myocardial infarction and/or cerebrovascular accident (2), and thrombophlebitis (1). In subjects undergoing only diagnostic procedures, the major complication rate was 0.1%. CONCLUSIONS: Screening colonoscopy can be performed in multiple centers with a high degree of success and safety in large numbers of asymptomatic, average-risk men.	CSP SC **(2)**
Risk of death was decreased by 43% (hazard ratio = 0.57, 95% CI = 0.51-0.64) patients with history of non-metatastic CRC who had at least one follow-up colonoscopy compared with patients who had no follow-up colonoscopies.	ACG GI **(2,3)**
After adjusting for age, having a regular doctor and participation in general medical exams, race was not significantly associated with current CRC screening status, with an OR of 1.1 (95% CI 0.7-1.6).	Race & Screen **(2)**
Of 1994 persons, 67 (3.4%) had advanced proximal neoplasia. A low-risk subgroup comprising 37% of the cohort	CRC Neo

Description	Project Label and Center (Goal)
had scores of 0 or 1 and a risk of 0.68% (95% CI, 0.22% to 1.57%). Among the validation group of 1031 persons, risk for advanced proximal neoplasia in the low-risk subgroup (comprising 47% of the cohort) was 0.4% (upper confidence limit of 1.49%). Application of this index detected 92% of persons with advanced proximal neoplasms and, if applied following screening sigmoidoscopy, could reduce the need for colonoscopy by 40%. The marginal benefit of colonoscopy among low-risk persons was small: To detect 7 additional persons with advanced proximal neoplasia, 1217 additional colonoscopies would be required. CONCLUSIONS: This clinical index stratifies the risk for advanced proximal neoplasia and identifies a subgroup at very low risk. If it is validated in other cohorts or groups, the index could be used to tailor endoscopic screening for colorectal cancer.	**(2)**
In this randomized control trial, direct mail FOBT was found to significantly increase CRCS rates in a general population when conducted in the context of community-wide education and awareness campaign. No significant differences in rate increases were found between reminder and non-reminder arms of the intervention.	Wright county **(2)**
Databases	
CRC SAFE	CRC SAFE **(1,2)**
Measures and methods	
Automated EMR extraction routines have been developed that extract VistA data and compute delay and rate of referral for GI consult following positive initial screening, delay and rate of scheduling of CDE following positive initial screening and delay and rate of completion of CDE following positive initial screening. We are currently developing analogous measures for delay and rate of CDE following presentation with signs and symptoms and delay and rates of stage-appropriate treatment.	CRC SAFE, CanCORS **(1,2,3)**

II.3 Dissemination: Publications and Presentations

Table 2 documents QUERI Center dissemination activity (during primarily the previous calendar year) to external policy, practice and research audiences and to internal (VHA) audiences. The CRC QUERI is comprised of energetic and prolific researchers and clinicians. Our publications and other dissemination articles target scholarly and scientific audiences, applied and practitioner audiences, and national policy makers. We have fewer publications in QUERI step 4 and 5 than the other steps, reflecting our relatively recent startup as well as publication lag time.

Dr. Bond continues to be tireless in his efforts to educate and motivate providers to conduct guideline-adherent screening. All our CRC QUERI investigators made a significant contribution to the sum total of knowledge on appropriate clinical treatment, variations in best practices associated with CRC, and factors contributing to variations. In addition, we have made a significant contribution in advancing the knowledge, conceptual, and methodologic base for studying and addressing race/ethnicity disparities in care and outcomes.

Table 2. Publications and Presentations

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Research Publications										
Baxter NN, Palda V	Guidelines for colorectal surgery.	Seminars in Colorectal Surgery 2003; 14:19-25.	Core		X					
Baxter NN, Rothenberger DA, Lowry AC.	Measuring fecal incontinence.	Dis Colon Rectum 2003; 46:1591-605.	Core						X	
Baxter, NN, Rothenberger DA, Morris AM, Bullard KM.	Adjuvant Radiation for Rectal Cancer: Do We Measure Up to the Standard of Care?	Dis Colon Rectum 2005; 48: 9-15.	Core			X				
Baxter NN, Morris AM, Rothenberger DA, Tepper JE.	The impact of preoperative radiation for rectal cancer on subsequent lymph node evaluation: A population-based analysis.	Int J Radiation Oncology Biol Phys 2005; 61: 426-31.	Core			X				
Baxter NN, Virnig DJ, Rothenberger DA, Morris AM, Jessurun J, Virnig BA.	Lymph Node Evaluation in Colorectal Cancer Patients: A Population-based Study	J. Natl Cancer Inst 2005; 97:219-25	Core			X				
Bond JH.	*Fecal occult blood test screening for colorectal cancer.*	*Gastrointestinal Endoscopy Clinics of North America 12(1): 11-21, 2002.*	*Core*		*X*					
Bond JH.	*Screening for colorectal cancer: Preface.*	*Gastrointestinal Endoscopy Clinics of North America 12(1): XIII-XV, 2002.*	*Core*		*X*					

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Bullard KM, Trudel JL, Baxter NN, Rothenberger DA	Primary perineal wound closure after ARP: doomed to fail?	Dis Colon Rectum	Core			X				
Nelson DB, McQuaid KR, Bond JH, Lieberman DA, Weiss DG, Johnston TK, Provenzale, D and the VA Cooperative Study Group #380.	*Procedural success and complications of large-scale screening colonoscopy.*	*Gastrointest Endosc 55:307-14, 2002.*	*CSP SC*							*X*
Rex DK, Bond JH, Winawer SJ, Levin TR, Burt RW, Johnson DA, Kirk LW, Litlin S, Lieberman DA, Waye JD, Church J, Marshall J, Riddell RH.	*Quality in technical performance of colonoscopy and the continuous quality improvement process for colonoscopy: Recommendations of the Multi-Society Task Force on Colorectal Cancer.*	*Amer J Gastroenterol 2002;97:1296-1308.*	*CSP SC*		*X*					
Saunders CS, Bond JH, Burt RW.	*How to increase colorectal cancer screening rates.*	*Patient Care 36:32-43, 2002.*	*Core*				*X*			
Bond JH, Koretz RL.	*Colon cancer screening: Science, recommendations, and doubts.*	*Medical Crossfire 4:30-40, 2002.*	*Core*		*X*					
Bond JH.	*Colorectal cancer screening: The potential role of virtual colonoscopy.*	*J Gastroenterol 37:92-96, 2002.*	*Core*		*X*					

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Winawer S, Fletcher R, Rex D, Bond J, Burt R, Ferrucci J, Ganiats T, Levin T, Woolf S, Johnson D, Kirk L, Litin S, Simmang C for the U.S. MultiSociety colorectal Cancer Task Force.	Gastrointestinal Consortium Panel. Colorectal cancer screening and surveillance: clinical guidelines and rationale-Update based on new evidence.	Gastroenterology. 124(2):544-60, 2003 Feb.	Core		X					
Baron JA, Cole B, Sandler RS, Hallie R, Ahnen D, Bresalier R, McKeown-Eyssen G, Summers R, Rothstein R, Burke C, Snover D, Church TR, Allen JI, Beach M, Beck G, Bond JH, Greenberg ER, Marcon N, Mott L, Pearson L, Saibil F, van Stolk, for the Polyp Prevention Study Group.	A randomized trial of aspirin as a chemopreventive agent against colorectal adenomas.	N Engl J Med 2003; 348:891-99.	Core							X
Bond JH.	Colon polyps and cancer.	Endoscopy. 35(1):27-35, 2003 Jan.	Core							X
Bond JH.	GI Consultation: Colorectal cancer.	Emergency Medicine 2002;34:38-43.	Core		X					

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Lewis M, Bond JH.	The Gastroenterologists: A biography of John H. Bond, M.D.	Journal of Clinical Gastroenterology 2003;36:289-290.	Core		X					
Bond JH.	Update on colorectal polyps: Management and follow-up surveillance.	Endoscopy 35:35-40, 2003.	Core		X					
Bond JH.	Postpolypectomy surveillance.	In Colonoscopy: Principles and Practice. Waye JD, Rex DK, Williams CB (eds). Blackwell Publishing, Ltd., Oxford, U.K., 2003, pp. 459-467.	Core		X					
Bond JH.	Screening for colorectal cancer.	New Horizons (in press).	Core		X					
Saunders CS, Bond JH.	Screening for colorectal cancer: The newest evidence.	Patient Care (in press).	Core		X					X
Bond JH.	Screening for colorectal cancer: Is there progress for early detection?	Pract Gastroenterol (in press).	Core		X					X
Lieberman, Collins JF, Durbin TE, Weiss DG, Bond, JH and the VA cooperative Study #380 Group.	Screening for colorectal neoplasia with digital exam versus 6-sample fecal occult blood test.	JAMA (in press).	Core							X
Bond JH.	Preface on virtual colonoscopy.	In Atlas of Virtual Colonoscopy. Dachman AH, editor (in press).	Core		X					X
Burgess, D, van Ryn, M, and Fu, S.	Making sense of the provider role in promoting disparities.	Journal of General Internal Medicine (in press).	Provider Attitudes			X				
Ioannou GN, Chapko MK, Dominitz JA.	Predictors of colorectal cancer screening participation in the United States.	American Journal of Gastroenterology 2003;98(9):2082-91.	Core			X			X	

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Ko CW, Dominitz JA, Nguyen TD.	Fecal occult blood testing in a general medical clinic: comparison between guaiac-based and immunochemical tests.	Am J Med 2003;115:111-114.	Core		X					X
Selinger RRE, Norman S, Dominitz JA.	Failure of health care professionals to accurately interpret fecal occult blood tests.	Am J Med 2003;114:64-7.	Core			X				
Dominitz JA, Eisen GM, Baron TH, Goldstein JL, Hirota WK, Jacobson BC, Johanson JF, Leighton JA, Mallery JS, Raddawi HM, Vargo JJ 2nd, Waring JP, Fanelli RD, Wheeler-Harbough J, Faigel DO.	Complications of colonoscopy.	Gastrointest Endosc.2003; 57(4):441-5.	Core							X
Fisher DA, Jeffreys A, Grambow SC, Provenzale D.	Mortality and follow-up colonoscopy after colorectal cancer.	Am J Gastroenterol 2003;98:901-906.	ACG GI		X	X				
Fisher DA, Dougherty K, Martin C, Galanko J, Sandler RS, Provenzale D.	Race and colorectal cancer screening.	Gastroenterology 2003;124:A-82.	Race & CDE			X				
Fisher DA, Allan M, Martin C, Galanko J, Sandler RS, Provenzale D.	Predictors of colorectal cancer screening behavior.	Gastroenterology 2003;124:A-621.	ACG GI			X			X	

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Fisher DA, Martin C, Galanko J, Sandler RS, Provenzale D.	Colorectal cancer: risk factors for advanced disease.	Gastroenterology 2003;124:(4):A-79.	ACG GI			X				X
Imperiale TF, Wagner DR, Lin CY, Larkin GN, Rogge JD, Ransohoff DR.	Using risk for advanced proximal colonic neoplasia to tailor endoscopic screening for colorectal cancer.	Ann Int Med 2003; 139: 959-965.	CRC Neo		X		X	X		X
Yeazel MW, Church TR, Jones RM, Kochevar LK, Watt GD, Cordes JE, Engelhard D, Mongin SJ.	Colorectal Cancer Screening Adherence in a General Population.	Cancer Epidemiology, Biomarkers & Prevention (Contents (Apr 1, 2004, Volume 13, Number 4).	Wright County				X	X		X
Church TR, Yeazel MW, Jones RM, Kochevar LK, Watt GD, Mongin SJ, Cordes JE, Engelhard D.	A Randomized Trial of Directly Mailing Fecal Occult Blood Tests to Increase Screening in a General Population.	Journal of the National Cancer Institute *Journal of the National Cancer Institute*, 2004; 96: 770-780.	Wright County				X	X		X
Myers RE, Turner B. Weinberg D, Hauck WW, Hyslop T, Brigham T, Rothermel T, Grana J, Schlackman N.	*Complete diagnostic evaluation in colorectal cancer screening: research design and baseline findings.*	*Preventive Medicine. 33(4):249-60, 2001 Oct.*	*CRC DE*			*X*	*X*			
Turner B, Myers RE, Hyslop T, Hauck WW, Weinberg D, Brigham T, Grana J, Rothermel T, Schlackman N.	Physician and Patient Factors Associated with Ordering a Colon Evaluation After a Positive Fecal Occult Blood Test.	Journal of General Internal Medicine 18:357-363, 2003.	CRC DE			X				

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Baig N, Myers RE, Turner BJ, Grana J, Rothermel T, Schlackman N, Weinberg DS.	Physician-reported reasons for limited follow-up of patients with a positive fecal occult blood test screening result.	American Journal of Gastroenterology. 98(9):2078-81, 2003 Sep.	CRC DE			X				
Provenzale D.	*The cost-effectiveness of screening the average-risk population for colorectal cancer.*	*Gastrointest Endo Clin NA 2002;12(1):93-109.*	*Cost Utility*				*X*		*X*	*X*
Provenzale D.	*Aspirin as an adjunct to colorectal cancer screening: is it cost-effective?*	*Evidence-Based Gastroenterology 2002;(2):57-58.*	*Core*		*X*				*X*	*X*
Provenzale D, Gray RN, Fisher D, Schmidt T.	*Patient-Centered Outcomes in Colorectal Cancer Screening.*	*Evidence-Based Gastroenterology 2002;3:12-25.*	*ACG GI*						*X*	*X*
Provenzale D, Ofman J, Gralnek I, Rabeneck L, Koff R, McCrory D.	Gastroenterologist specialist care provided by generalists - an evaluation of effectiveness and efficiency.	Am J Gastroenterol 2003;98(1):21-28.	CRC VA Cost		X				X	X
Farraye F, Horton K, Hersey H, Trnka Y, Hereen, T, Provenzale D.	Screening flexible sigmoidoscopy using an upper endoscope is better tolerated by women.	Am J Gastroenterol (in press).	Core		X					X
Provenzale D, Gray R.	Colorectal Cancer Screening and Treatment: A Survey of Outcomes Research.	J Natl Cancer Inst 2003 (in press).	Core		X					
Provenzale D.	Screening and Surveillance of Gastrointestinal Cancers.	In: Rustgi AK, Crawford JM (eds) Gastrointestinal Cancers A Companion to Sleisenger and Fordtran's Gastrointestinal and Liver Disease. Philadelphia:Saunders, 2003.	Screen GI							

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Levin B, Smith RA, Feldman GE, Colditz GA, Fletcher RH, Nadel M, Rothenberger DA, Schroy III PS, Vernon SW, Wender R.	*Promoting early detection tests for colorectal carcinoma and adenomatous polyps. A framework for action: The strategic plan of the National Colorectal Cancer Roundtable.*	*Cancer 2002;95:1618-1628.*	*Core*		*X*					
Rothenberger DA, Garcia-Aguilar J.	*Management of cancer in a polyp.*	*In: Saltz L, ed. Colorectal cancer: multimodality management. New Jersey: Humana Press, 2002:325-335.*	*Core*		*X*					
Michelassi F, Bleday R, Brown G, Rothenberger DA, Vernava AM III, Willett C, Wong WD.	The multidisciplinary treatment of rectal cancer. [Symposium]	Contemp Surg 2003;59:12-21.	Core		X					
Garcia-Aguilar J, Sirivongs P, Lee S, Madoff RD, Rothenberger DA.	A pathologic complete response to preoperative chemoradiation is associated with lower local recurrence and improved survival in rectal cancer patients treated by mesorectal excision.	Dis Colon Rectum 2003;46:298-304.	Core							X
Dykes SL, Qui H, Rothenberger DA, Garcia-Aguilar J.	Evidence of a preferred molecular pathway within patients with synchronous colorectal cancer.	Cancer 2003;98:48-54.	Core							X
Rothenberger DA.	If you can keep your head…clinical decision-making in the age of evidence based medicine.	Dis Colon Rectum (in press).	Core		X					
Rothenberger DA, Akbari R, Baxter, NN.	*Are we overtreating some patients with rectal cancer?*	*Oncology*	*Core*			*X*				

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
van Ryn, M.	*Research on the Provider Contribution to Race/ethnicity Disparities in Medical Care.*	*Medical Care 2002, 40(1):I140-I151.*	*Provider Attitudes*			*X*				
van Ryn, M. and Fu, S.	Paved With Good Intentions: Do Public Health and Human Service Providers Contribute to Race/Ethnicity Disparities in Health?	American Journal of Public Health, 93(2).	Provider Attitudes			X				
van Ryn, M and Williams, D.	Commentary on Racial Disparities in Health Care.	Medical Care Research and Review 2003; 60(4) (Invited, editorial review).	Provider Attitudes	X	X					
van Ryn, M and Burgess, D.	How do we advance meaningful research on disparities in health care?	Canadian Medical Association Journal (in press).	Provider Attitudes						X	
Anderson WF, Guyton KZ, Hawk ET, Levin B, Vernon SW, Hiatt R.	*Colorectal cancer screening for persons at average risk.*	*Journal of the National Cancer Institute, 94:1126-1133, 2002.*	*Core*							
Klabunde CN, Frame PS, Meadow A, Jones E, Nadel M, Vernon SW.	A national survey of primary care physicians' colorectal cancer screening recommendations and practices.	Prev Med, 36:352-362, 2003.	Core			X				
Cokkinides VE, Chao A, Smith RA, Vernon SW, Thun MJ.	Correlates of underutilization of colorectal cancer screening among U.S. adults, age 50 years and older.	Prev Med, 36:85-91, 2003.	Core			X				
Menon U, Champion VL, Larkin GN, Zollinger TW, Vernon SW.	Beliefs associated with fecal occult blood test and colonoscopy use at a worksite colon cancer screening program.	J Occup Environ Med, 45:891-898, 2003.	Core			X				

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Watts BG, Vernon SW, Myers RE, Tilley BC.	Intention to be screened across time in male automotive workers.	Cancer Epidemiology, Biomarkers & Prevention, 12:339-349, 2003.	Core			X				
Vernon SW, Briss P, Tiro J, Warnecke RB.	Some methodologic lessons learned from cancer screening studies.	Cancer (in press).	Core						X	
Seeff LC, Nadel MR, Klabunde C, Thompson T, Shapiro JA, Vernon SW, Coates R.	Patterns and predictors of colorectal cancer test use in the adult U.S. population.	Cancer (in press).	Core			X				
Meissner HI, Smith RA, Rimer BK, Briss P, Rakowski W, Wilson K, Vernon SW.	Promoting cancer screening: learning from experience.	Cancer (in press).	NetLET				X	X		X
Ford ME, Randolph V, Hopkins-Johnson L, Eason SL, Havstad S, Jankowski M, Swanson GM, Vernon SW.	Design of a case management approach to enhancing cancer screening trial adherence among older African American men.	Journal of Aging and Health (in press).	Core				X			
Non-Research Publications										
Presentations										
Baxter, N.	Screening for the average risk. When, how and how often?	American College of Surgeons Annual Fall Meeting, Chicago October 22, 2003.	Core		X					

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Baxter N, Durham SB, Tepper J, Virnig BA	The Risk of Rectal Cancer is increased after Prostate Radiation: a Population-based Study	2005 GI Cancer Symposium, Hollywood FL.	Core			X				
Baxter, N.	Local excision for early rectal cancer.	Perspectives in Colorectal Cancer, Washington DC September 12, 2003.	Core		X					
Baxter, N.	What is Clinical Research? Definitions.	American Society of Colon and Rectal Surgeons, Annual Meeting New Orleans LA, June 24, 2003.	Core						X	
Baxter, N.	Screening for Colorectal Cancer.	University of Minnesota Family Practice Review, Update 2003. May 7, 2003.	Core		X					
Baldwin LM, Dobie S, Billingsley K, Matthews B, Dominitz J, Schwartz D.	Racial and Ethnic Disparities in Colorectal Cancer Treatment.	AcademyHealth Annual Research Meeting, Nashville, TN, June 2003. (poster)	Core			X				
Ko CW, Nguyen TD, Dominitz J.	Fecal occult blood testing in a general medical clinic: comparison between guaiac-based and immunochemical tests.	104th Annual Meeting – American Gastroenterology Association, Orlando, FL, May 2003. (poster)	*Core*							X
Etzioni DA, Asch SM, Rubenstein LV, Lee ML, Ko CY, Brook RH, Parkerton PH, Soban LM, Yano EM.	Measuring the quality of colorectal cancer screening programs: Are screening penetration rates adequate?	Robert Wood Johnson Foundation Clinical Scholars Program Meeting, September 2003.	Org CRC			X			X	X

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Ferreira M.R.	Race and Education: hidden barriers for colorectal cancer screening?	Annual Meeting of the VA Health Services Research & Development (HSR&D) Service, Washington, D.C., February 2003.	*CRC Health Literacy & Race*			X				
Ferreira M.R.	Social demographic barriers to colorectal cancer screening.	Annual Meeting of the American Gastroenterological Association, Orlando, FL, May 2003.	*CRC Health Literacy & Race*			X				
Griffin, J, Rubins, H.B., Struve, J, Liu, A, Nelson, D.B.	The Efficacy of Informed Consent in a Large Clinical Trial. Poster presentation given at the	21st Annual VA Health Services Research and Development (HSR&D) Service Meeting, February, 2003 in Washington DC. (poster)	Core						X	
Helfand, M.	Screening Advice from the US Preventive Services Task Force.	2002 Annual Session of the American College of Physicians, April 12, 2002, Philadelphia, PA.	Core		X					
Helfand, M.	Translation of Colorectal Cancer Screening Guidelines into Practice: A System Intervention.	CORI (Clinical Outcomes Research Initiative) Steering Committee, December 12, 2002, Portland, OR.	CRC SDP				X			
Kochevar, L.	Implications of Functional Variability for Performance Improvement and Management.	The University of Minnesota Clinical Outcomes Research Center (CORC) February 23, 2004, Minneapolis, MN.	CRC Endo1						X	X
Kochevar, L.	Endoscopic Throughput Optimization Variants: Implications For Improvement.	QUERI National Meeting, December 10-12, 2003, Washington DC. (poster)	CRC Endo1			X			X	X
Kochevar, L.	HSR&D Funding of Guideline Implementation Efforts.	VA/DOD National Clinical Practice Guidelines Council, June 6, 2003, Washington DC.	Core							

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Kochevar, L.	The VA/NCI Colorectal Cancer QUERI: A Comprehensive Approach Quality Improvement.	NCI Quality Cancer Care Committee, June 16, 2003, Washington DC.	Core						X	
Kochevar, L.	A Roadmap for Rapid and Systematic Translation: The VA/NCI Colorectal Cancer QUERI.	The Third Outcomes Management Conference The Quality of Cancer Care: From Evidence to Action, September 17-18, 2003, Chicago Il.	Core						X	
Kochevar, L.	Colorectal Cancer Screening Intervention Effectiveness Given Readiness to Change & Attitude Toward Screening.	The Society for Medical Decision Making 25th Annual meeting, October 18-22, 2003, Chicago, Il.	Wright County				X	X		X
Kochevar, L.K., Johnson, Paul E, Potthoff, S.	Functional Variability in Home Health Care Case Management.	The Society for Medical Decision Making 25th Annual meeting, October 18-22, 2003, Chicago, Il. (poster)	Core						X	X
Kochevar, L.	VA/NCI Colorectal Cancer QUERI Update.	Minnesota Colorectal Cancer Summit March 13, 2003, Saint Paul, Minnesota.	Core						X	X
Church, T.R., Yeazel, M., Jones, R., Mongin, S., Kochevar, L.K., Watt, G.	Sustainability of Colorectal Cancer Screening Promotion in the General Population.	37th Annual Society for Epidemiologic Research Meeting, Salt Lake City, UT. *Abstract published: Supplement of the American Journal of Epidemiology*. June, 2004.	Wright County				X	X		X

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Jones, R.M., Church, T.R., Yeazel, M.W., Kochevar, L.K., Watt, G.	Validity of self-reported colorectal cancer screening in a general population.	37th Annual Society for Epidemiologic Research Meeting, Salt Lake City, UT. Abstract published: *Supplement of the American Journal of Epidemiology*, June, 2004.	Wright County				X	X		X
Yeazel, M., Church, T., Jones, R., Kochevar, L., Watt, G. Mongin, S, Cordes, J., Engelhard, D.	Increasing screening in a general population: The Wright County Colorectal Cancer Screening Project.	Presented as a Distinguished Paper at the 31st North American Primary Care Research Group Meeting, Banff, Alberta, Canada.	Wright County				X	X		X
Khurana, V., Sontag, S., and Kochevar, L.K.	Screening For Colorectal Cancer Using Colonoscopy Is Feasible In The VA System Depending On Appropriateness Of Resources.	69th Annual Scientific Meeting of the American College of Gastroenterology, Orlando, FL, October 31- November 3, 2004.	GI FAC			X				
Partin, M.	*Facilitating Informed Patient Decision Making About Prostate Cancer Screening.*	*24th Annual Conference on Patient Education jointly sponsored by the Society of Teachers of Family Medicine and the American Academy of Family Physicians. November 23, 2002, Fort Lauderdale, Florida. (Lecture presentation with Nancy Dillon).*	*Core*				*X*	*X*		
Partin, M.	Facilitating Informed Decision Making about Prostate Cancer Screening: Evaluation of two approaches.	21st Annual VA Health Services Research Meeting, February 2003, Washington DC.	Core				*X*	*X*		

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Partin, M.	Effect of Prostate Cancer Screening Decision Aids on Decision Making Process Outcomes: Results from a Randomized Trial.	Seventh Annual Minnesota Health Services Research Conference, March 4, 2003, Minneapolis MN.	Core				*X*	*X*		
Provenzale, D.	*Screening for Colorectal Cancer in Asymptomatic Individuals*	*American College of Gastroenterology Postgraduate Course, October 2001, Las Vegas, NV.*	*Core*		*X*					
Provenzale, D.	*Economic Analysis of GI Screening and Surveillance Programs.*	*University of Pennsylvania, Philadelphia, PA, February 2002 –(Visiting Professor)* *University of California-Los Angeles, June 2002, Los Angeles, CA. (Visiting Professor)*	*Cost Utility*					*X*	*X*	*X*
Provenzale, D.	*Cost Effective Strategies for Screening and Surveillance.*	*American College of Gastroenterology Postgraduate Course, October 2002, Seattle, WA.*	*Cost Utility*					*X*	*X*	*X*
Provenzale, D.	Colon Cancer Prevention.	Duke University Clinical Training, Durham, NC, May 2003.	Core		X					
Provenzale, D.	Why is Everything cost-effective? Limitations of Decision Analysis Models".	Digestive Disease Week, AASLD Clinical Research Workshop, Orlando, FL, May 2003.	Cost Utility						X	X
Rothenberger, D.	Overview: Epidemiology, Indications, Goals, Extent and Nature of the Work-up.	Consensus Conference: Palliative Therapy of Rectal Cancer, Digestive Disease Week, May 2003, Orlando, FL.	UMN Cancer Center		X					

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Rothenberger, D.	Dogma, Myths and Realities about Radical Surgery for Rectal Cancer: Who's Kidding Whom?	Clinical Symposia: Rectal Cancer in the 21st Century (Co-moderator), Digestive Disease Week, May 2003, Orlando, FL.	UMN Cancer Center		X					
Rothenberger, D.	Controversies: Are We Overtreating Some Patients With Rectal Cancer?	Meet the Professor Session, American; Society of Clinical Oncology Annual Meeting, Chicago, IL, June 2003.	UMN Cancer Center		X					
Rothenberger, D.	Strategies in the Early Detection of Colorectal Cancer.	67th Annual Course: Advances in Breast, Endocrine, and Cancer Surgery, Department of Surgery, University of Minnesota, Minneapolis, MN, June 2003.	UMN Cancer Center		X					
Rothenberger, D.	"The Nuts and Bolts of Clinical Research: A Practicing Surgeon's Guide to New Opportunities.	Society of Colon & Rectal Surgeons Annual Meeting, New Orleans, LA, June 2003.	UMN Cancer Center		X					
Rothenberger, D.	Rationale and Technique of Total Mesorectal Excision," Key Issues in Management of Rectal Cancer Session.	American College of Surgeons Clinical Congress, Chicago, IL, October 2003. (Moderator)	UMN Cancer Center		X					
van Ryn, M.	Promoting Caregiving Beyond Culture: Provider Behavior in a Multicultural Context.	Grantmakers in Health Fall Forum 2003; Barbara Jordan Conference Center, The Henry J. Kaiser Family Foundation, November 6, 2003, Washington DC.	Core			X				

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
van Ryn, M.	Racial and Ethnic Disparities in Implementing Research: Why are non-whites less likely to benefit from research evidence? The effect of non-clinical factors on clinical decision-making.	Agency for Health Care Quality Translation of Research into Practice (TRIP) meeting, July 23, 2003, Washington DC.	Provider Attitudes			X				
van Ryn, M.	Systematic approaches to quality of CRC early detection and care.	The Third Outcomes Management Conference: Quality of Cancer Care: from Evidence to Action, September 17-18, 2003, Chicago, IL.	Core		X		X			
Parkerton PH, Yano EM, Soban L, Etzioni D.	Influence of primary care practice autonomy on colorectal cancer screening.	VA QUERI Annual Meeting, December 10, 2003Washington DC. (poster)	Org CRC			X				X
Sifri RD, Hyslop T, Chirapongse E, Vernon SW, Jimbo M, Rosenthal ML, Wender RC, Myers RH.	Patient decision staging for fecal occult blood testing and flexible sigmoidoscopy.	31st Annual meeting of the North America Primary Care Research Group, Banff, Alberta, Canada, Oct 27, 2003.	Tailored CRC				X			X
Etzioni DA, Yano EM, Rubenstein LV, Lee ML, Ko CY, Brook RH, Parkerton PH, Soban LM, Asch SM.	Is colorectal cancer screening penetration an adequate quality measure?	VA QUERI Annual Meeting, Washington DC, December 10-12, 2003. (poster)	Org CRC			X			X	X
Soban L, Yano EM, Parkerton PH.	Impact of primary care resource sufficiency on colorectal cancer screening.	VA QUERI Annual Meeting, Washington DC, December 10, 2003. (poster)	Org CRC			X				X

Author(s)	Title	Journal/Presentation	Project Label	QUERI Activity Code						
				1	2	3	4	5/6	M	C
Etzioni DA, Asch SM, Rubenstein LV, Lee ML, Ko CY, Brook RH, Yano EM.	Colorectal cancer screening and follow-up in the VA.	Robert Wood Johnson Foundation Clinical Scholars Program Meeting, June 2003.	Org CRC			X			X	X
Other Dissemination/Publicity Efforts										
Kochevar, L. & van Ryn, M.	VA Targets Improvements in CRC Screening	US Medicine, May 2003	Core						X	

II.4 Active and Completed Projects

Table 3 provides information on the quantity, depth, and breadth of our current and recently completed projects. These projects are also depicted in our pipeline diagram (Figure 1). As indicate in Table 3, the projects also represent the entire QUERI six-step process.

We have learned a tremendous amount from our active and completed projects. Our studies have provided tremendous insight into the factors contributing to failed CDE, pointing to factors that must be primary targets for intervention: communication of lab results, prompt referral, adequate endoscopy prep and appointment-adherence, all contribute to completion of CDE. We know that the relative contribution of provider referral vs. patient adherence for colonoscopy varies by facility, and tailored interventions will be needed. We have evidence suggesting that the widely cited lack of endoscopic capacity might be somewhat eased through increased efficiencies created by increased appointment adherence and decreased incomplete endoscopies due to poor prep. We learned that VA facilities with larger patient populations have more difficulties with both CRCS and CDE than smaller facilities. This indicates that the "low-hanging" fruit of implementation lies within these larger sites, allowing us to focus efforts even further.

The evidence base for the clinical practices of CRCS and CDE are extremely strong. Recent QUERI studies have made important contributions to understanding practice variation and performance gaps. The evidence base for interventions to bridge these gaps is much less well developed. While evidence regarding referral facilitation and appointment adherence can be drawn from multiple clinical settings (e.g. diabetes care, HIV screening and treatment) the unique demands of colonoscopy prep limit the generalizability of these studies to CRCS and CDE. Since low CDE rates and CDE delay are such pressing clinical problems with only a moderate intervention evidence base, we have adopted a methodology that combines randomized intervention trial methods with implementation research methods. This strategy dramatically cuts the product development cycle time lost to sequencing studies and omits (at least) one grant review cycle. Our first project using this strategy, "CRC SDP" develops, tests, and implements an electronic event notification system to facilitate referrals for CDE. Funded by NCI through the VA SDP mechanism, it has developed and deployed a pilot system at the Portland VA and is now conducting randomized testing and simultaneous implementation studies in four test sites and four control sites. Two additional projects have been proposed using this strategy. They are discussed in Section III.2, "Planned Projects."

The diagnostic and intervention development projects underway under Goal II (Screening) will provide the evidence base and site selection criteria for future implementation projects to

improve screening. Interventions being developed include patient activation and education, tailored reminder messages, direct mail of FOBT test kits, and web-based outreach. These projects combine strategies that can be used in a primary care setting with those that reach out to veterans in their homes. VA CanCORS and its ancillary studies will add to the evidence base on truly effective CRC treatment practices, describe deviations from standards of care and their underlying causes and suggest potential intervention strategies. CanCORS methodology is already being adapted for performance monitoring.

Our projects reflect our commitment to addressing inequalities in health outcomes; we have funded projects focusing on health literacy (a barrier that may mediate the relationship between low SES and screening rates), on race/ethnicity disparities in screening and in care, and on strategies for addressing such disparities and on special populations such as Vietnam veterans, the elderly and veterans with spinal cord injury.

Table 3. Active and Completed Projects

Project ID and (Center Goal)	Project Label	Project Title	Principal Investigator	Type / Source	Current FY Amount	Total Amount	Start – End Dates and Status	QUERI Activity Code						
								1	2	3	4	5/6	M	C
Goal 1: Improve the referral, show, and completion rate for CDE following a positive FOBT, FS, or DCBE														
XNV 21-063 **(1)**	Race & CDE	Race and Screening Follow-Up	Fisher, Deborah	ACG Clinical Research Award	$10,000	$10,000	7/03 – 6/04 Data Analysis	X		X				
CRS 02-162 **(1, 2)**	CRC SAFE	Colorectal Cancer Screening Assessment and Surveillance Data System	Kochevar, Laura	NCI	$331,100	$892,000	7/02 – 6/05 Analysis and dissemination	X		X			X	
CCDOR LIP DSC **(1,2)**	DSC Study	Provider Interview Study: Focus on Acceptability of Direct Screening Colonoscopy and Identification of Methods to Increase Endoscopic Appointment Completion Rates	Burgess, Diana & Kochevar, Laura	CCDOR (HSR&D) LIP	$60,125	$60,125	8/03 – 9/04 Analysis			X	X			
Core LIP **(1)**	CRC Endo2	Empirical Predictors of Endoscopy Non-Completion	Kochevar, Laura	CCDOR (HSR&D) LIP	$6,000	$6,000	8/03 – 9/04 Analysis			X	X		X	
Core LIP ***(1)***	*CRC Endo1*	*VHA Endoscopic Capacity*	*Kochevar, Laura*	*QUERI Core*	n/a	n/a	*10/02 – 10/03 Completed*			*X*			*X*	

Project ID and (Center Goal)	Project Label	Project Title	Principal Investigator	Type / Source	Current FY Amount	Total Amount	Start – End Dates and Status	QUERI Activity Code						
								1	2	3	4	5/6	M	C
CRT 02-059 **(1)**	CRC SDP	Translation of CRC Screening Guidelines to Practice - An Intervention	Helfand, Mark	NCI	$249,000	$498,000	3/03 – 2/05 Data Collection				X	X		
(1,2)	GI FAC	GI Leadership Opinion Survey	Kochevar, Laura	CRC QUERI LIP	$3,000	$3,000	4/04 – 9/04 Manuscripts			X				
(1,2)	CMO	CMO/QMO Survey of VA Colorectal Screening and Diagnosis Practices	Kochevar, Laura	CRC QUERI LIP	$3,000	$3,000	4/04 – 7/04 Manuscripts			X				
(1)	Key Informant	Key Informant Interview Study of CDE Policies and Procedures	Kochevar, Laura	VACO LIP	$50,000	$50,000	8/04 – 12/05 Data Collection			X				
5 R01CA68683-03 ***(1)***	*CRC DE*	*Enhancing Diagnostic Evaluation in Colorectal Cancer Screening*	*Myers, Ronald E.*	*NCI*	*n/a*	*$1,266,024*	*6/98 – 4/02 Completed*				*X*	*X*		
Goal 2: Reduce variation and improve CRC screening rates														
CSP380 ***(2)***	*Cost Utility*	*Screening for Colorectal Cancer in Asymptomatic Adults: A Cost Utility Analysis*	*Provenzale, Dawn*	*VA CSP*	*n/a*	*$298,155*	*4/97 – 10/02 Completed*	*X*					*X*	
CSP707 D ***(2)***	*CRC VA Cost*	*Colorectal Cancer Screening in the VA: A Cost Utility Analysis*	*Provenzale, Dawn*	*VA CSP*	*$72,371*	*$298,155*	*10/98 –12/02 Completed*	*X*					*X*	

Project ID and (Center Goal)	Project Label	Project Title	Principal Investigator	Type / Source	Current FY Amount	Total Amount	Start – End Dates and Status	QUERI Activity Code						
								1	2	3	4	5/6	M	C
CSP 380 ***(2)***	*CSP SC*	*Colonoscopy Screening*	*Bond, John (Co-investigator); (Liberman – PI)*	*VA CSP*	*n/a*	*Unreported*	*12/93 – 3/02 Completed*	*X*						*X*
RO1-CA79572 ***(2)***	*RO1 SC*	*Screening Colonoscopy Feasibility Trail*	*Bond, John (Co-investigator); (Winawer – PI)*	*NCI*	*n/a*	*$1,165,121*	*7/99 – 6/02 Completed*	*X*						*X*
RWJ 2002-020150 ***(2)***	*RWJ Etzioni*	*Effectiveness Study of Colorectal Cancer Screening at the VA*	*Etzioni, David*	*RWJ*	*$25,000*	*$25,000*	*6/02 – 7/03 Completed*	*X*						*X*
CRI 03-153 **(2)**	VALUE Study	Determining the Prevalence of Health Literacy Among Veterans	Griffin, Joan	IIR VA HSR&D	n/a	$997,256	10/03 – 9/05 Start-up Activities	X		X			X	
IIR 02-010 **(1,2)**	CRC Health Literacy & Race	The Impact of Health Literacy on Racial Differences in Cancer Stage at Presentation	Ferreira, M. Rosario (Co-investigator); (Arozullah, Ahsan – PI)	IIR VA HSR&D	$224,059	$969,736	4/03 – 3/07 Data Collection	X		X				
XNV 21-063 **(1,2)**	ACG GI	Patient-Centered Outcomes GI Screening/Surveillance	Fisher, Deborah	ACG Jr. Faculty Development Award	$50,000	$100,000	12/02 – 12/04 Data Collection			X			X	

Project ID and (Center Goal)	Project Label	Project Title	Principal Investigator	Type / Source	Current FY Amount	Total Amount	Start – End Dates and Status	QUERI Activity Code						
								1	2	3	4	5/6	M	C
CRS 02-163-1 **(2)**	Org CRC	Organizational Variations in Colorectal Cancer Screening Rates	Yano, Elizabeth	IIR VA HSR&D	$123,865	$168,820	7/02 – 6/03 Manuscripts			X			X	
K07 CA90359 01 **(2)**	CRC Sc Delivery & Utilizatio n	Delivery and Utilization of Colorectal Cancer Screening	Ling, Bruce	NIH/NCI	Not available.	$100,328	8/01 – 7/06 Data Collection			X				X
RO1 CA86424 -01A2 **(2)**	CRC & Health Belief	Health Belief Model-Directed Intervention For Colorectal Cancer Screening	Ferreira, M. Rosario (Co-investigator); (Bennett, Charles – PI)	NIH	$293,730	$857,114	7/01 – 6/04 Data Collection				X			
R01 CA97263 **(2)**	Tailored CRC	Tailored Interactive Intervention to Increase CRC Screening	Vernon, Sally	NIH/NCI	Not available.	$1,787,445	9/02 – 8/07 Data Collection				X	X		
ME-01-329 **(1, 2)**	GERA	Increasing Early Detection of Gastrointestinal Cancer	Myers, Ronald E.	Pennsylvania Commonwealth	Not available	$715,878	2/02 – 01/06 Data Collection				X	X		
R01CA84140-01A1 **(2)**	TECS	Increasing Colon Cancer Screening in Primary Care	Myers, Ronald E.	NCI	$463,881	$2,144,214	6/01 – 5/05 Data Collection				X	X		
273-MH-112289 **(2)**	GENOME	Decision Counseling For Colon Cancer Susceptibility Testing	Myers, Ronald E.	NIH	Not available	$99,900	8/01 – 7/04 Analysis				X	X		

Project ID and (Center Goal)	Project Label	Project Title	Principal Investigator	Type / Source	Current FY Amount	Total Amount	Start – End Dates and Status	QUERI Activity Code						
								1	2	3	4	5/6	M	C
1R21 CA89475 **(2)**	NetLET	Colorectal Cancer Screening and the NetLET Intervention	Vernon, Sally	NIH/NCI	n/a	$200,000	9/01 – 8/03 Completed				X	X		
Church, Timothy, PhD **(2)**	Wright County	Community Health Foundation of Wright County Screening Project	Kochevar, Laura (Co-investigator); (Church, Timothy – PI)	Allina prime	n/a	$365,645	11/99 – 6/03 Manuscripts				X	X		
RCD 01-005 **(2)**	CRC Knowledge & Attitudes	Colorectal Cancer Screening Knowledge and Attitudes: Impact of Intervention	Ferreira, M. Rosario	VA HSR&D Research Career Development Award	$136,520	$409,560	1/03 – 1/06 Data Collection				X	X		
PERT-5 **(2)**	CRC Sc & Endo	Coordinated Endoscopic Colorectal Cancer Screening	Ling, Bruce (Co-investigator); (Weissfeld – PI)	CDC	Not available.	$888,150	10/1/01 - 9/30/04 Data Collection				X	X		X
273-MH-219390 **(2)**	Data Management	Decision Counseling for Colon Cancer Susceptibility Testing – Data Management	Myers, Ronald E.	NCI	$24,786	$24,786	9/02 – 9/03 Completed	X					X	
Goal 3: Improve the quality of cancer care and reduce suffering and mortality among CRC patients in VA														

Project ID and (Center Goal)	Project Label	Project Title	Principal Investigator	Type / Source	Current FY Amount	Total Amount	Start – End Dates and Status	QUERI Activity Code						
								1	2	3	4	5/6	M	C
(3)	Tumor Registry	Tumor Registry	Dominitz, Jason	ERIC	$25,000	$25,000	Start-Up						X	
1K-24-DK02926-01 **(2,3)**	Screen GI	Screening Surveillance for GI Malignancies	Provenzale, Dawn	NIH	$102,140	$510,699	2/99 – 3/05 Data Collection	X						X
CRS 02-164 **(3)**	VA CanCORS	Colorectal Cancer Care Outcomes Research and Quality Surveillance Data System (CanCORS)	Provenzale, Dawn & van Ryn, Michelle	NCI/HSR&D	$400,500	$4,695,660	7/03 – 6/08 Start-up Activities/Data Collection	X	X	X			X	X
CA89544 **(3)**	CRC in Elderly	Colorectal Cancer Care Variation in Vulnerable Elderly	Dominitz, Jason	NCI	$373,186	$1,066,640	Data Analysis	X		X				
Goal 4: Monitor, advise, and encourage clinical research to expand the pool of evidence-based clinical practices, evidence-based intervention strategies, identification of at-risk populations, and high burden clinical conditions.														
n/a **(4)**	CRC Neo	Case Control Study: A Pilot Case Control Study of Risk Factors for Advanced Sporadic Colorectal Neoplasia Prior to Age 50	Imperiale, Thomas	ASGE	$30,000	Not available.	1/03 – 6/04 Data Analysis	X						X

Project ID and (Center Goal)	Project Label	Project Title	Principal Investigator	Type / Source	Current FY Amount	Total Amount	Start – End Dates and Status	QUERI Activity Code						
								1	2	3	4	5/6	M	C
n/a **(4)**	CP/CRC Prevention	Multi-Agent Prevention of Colon Polyps and Colorectal Cancer	Dominitz, Jason	University of Michigan Comprehensive Cancer Center	$10,000	$14,500	7/03 – 6/04 Data Analysis	X						X
Cross cutting projects														
5P01 HS10864-04 **(1,2,3)**	HDMAA	Health Disparities in Minority Adult Americans (Project 2)	Ling, Bruce (Co-investigator); (Ricci/Trauth – Co-PIs)	AHRQ	Not available.	$1,067,002	9/01 – 8/05 Data Collection			X				X
CCDOR Provider **(1-4**)	Provider Attitudes	Providers perceptions of disparities and interventions approaches	Burgess/ van Ryn	CCDOR (HSR&D) LIP	$52,304	$59,691	8/03-9/04 Data Collection			X	X		X	

Part III. Plans for Subsequent Periods

III.1 Overview

Table 4 provides an overview of our plans, organized by the CRC QUERI goal(s) it serves. They are entered roughly in order of their association with a QUERI step(s).

III.2 Planned Projects

In order to achieve our first goal, to ***improve the referral, show, and completion rate for CDE following a positive screening test***, we have proposed three projects to address scheduling, appointment adherence, and colonoscopy prep issues. The Telehealth project develops, tests and implements the "GIVER" system (Gastroenterology Interactive Voice Education and Reminders) in a singe high-need site. GIVER will use interactive voice response to provide education, motivation, scheduling facilitation and appointment reminders to help patients successfully adhere to CDE requirements. A GI advisory panel recruited from a variety of sites will oversee GIVER development and implementation to facilitate multi-site roll out. The coloprep project develops, tests, and implements an informatics system to facilitate the use of oral Phos-soda colonoscopy prep. Phos-soda is associated with greater patient acceptance, adherence and superior prep results but is only used in 42% of VA facilities. Providers in facilities that do not use Phos-soda cite the difficulty of identifying patients at risk for side effects due to renal failure and/or electrolyte imbalance. The coloprep system will search the electronic medical record and warn the provider if the patient is at risk. The CRC-SAFE II project is planned to facilitate and evaluate regional and/or national roll out of a proposed performance monitoring and feedback system based on CRC-SAFE and CanCORS. The Capacity project is a rapid-response project requested by the CMO/QMO workgroup. We will be estimating the number of GI providers and clinic staff necessary to provide prompt CDE following positive screening across the VA.

We plan a number of projects intended to provide foundational work toward our second goal, to ***reduce variation and improve CRC screening rates.*** We are planning diagnostic projects to provide information needed to inform patient-centered intervention strategies, with special attention to most at-risk populations (e.g., minority, low literacy) and projects testing promising intervention strategies.

We plan a number of projects intended to provide foundational work toward our third goal, ***improve the quality of cancer care and reduce suffering and mortality among CRC patients in VA.*** This goal requires projects at steps in the QUERI process that include improving the evidence base. A number of our projects build on the CanCORS dataset in assessing factors contributing to variation in care and outcomes.

Table 4. Planned Projects

Project ID and (Center Goal)	Project Label	Project Title or Description	Principal Investigator	Type / Source	Status	QUERI Activity Code						
						1	2	3	4	5/6	M	C
Goal 1: Improve the referral, show, and completion rate for CDE following a positive FOBT, FS, or DCBE												
NIH PAR-04-036 **(1)**	Vv CRC	Vietnam Veterans and Colorectal Cancer Screening (1/05-12/09)	Vernon, Sally	NIH	Other: Approval pending	X		X				
(1)	DD in CRC	Diagnostic Delay in Colorectal Cancer: This is a CanCORS ancillary study that would collect additional data to determine patient, provider, and institutional delays to the diagnosis of colorectal cancer.	Fisher, Deborah & Provenzale, Dawn	VA HSR&D (VA CanCORs)	Other: Pending approval from CanCORS Steering Committee			X				
IIR 03-311-1 **(1, 2)**	Provider Survey	CRC Provider Survey: Translation Diagnosis and Baseline Measurement	van Ryn, Michelle	VA HSR&D	On hold pending recruitment			X			X	
(1,2)	CRC P&D Barriers	Multilevel Barriers to Colorectal Cancer Prevention and Detection (1/05-12/07)	Fisher, Deborah	VA HSR&D Career Development Award	Other: Approval pending			X				
(1)	Telehealth	Home Telehealth Reminders to improve Colonoscopic Prep and Reduce No-show	Kochevar, Laura	VA HSR&D	Other: Approval pending				X	X		
(1)	Colo-prep	Effect of a System for Determining Method of Preparation for Colonoscopy	Imperiale, Thomas	VA HSR&D	Other: Approval pending				X	X		
Goal 2: Reduce variation and improve CRC screening rates												
(2)	SPC for CRC	Structuring Primary Care for Colorectal Cancer Screening	Yano, Elizabeth	AHRQ	Other: Resubmission Pending			X	X			
(2)	Veteran Survey	Assessing and Addressing Patient Colorectal Cancer Screening Barriers	Partin, Melissa	VA HSR&D	Start up 7/1/05			X			X	

Project ID and (Center Goal)	Project Label	Project Title or Description	Principal Investigator	Type / Source	Status	QUERI Activity Code						
						1	2	3	4	5/6	M	C
NIH PAR-04-036 **(2)**	Vet CRC Screening	Colorectal Cancer Screening Behavior in a Veteran Population (1/05-12/06)	Fisher, Deborah	NIH	Other: Approval pending			X			X	
(2)	CRC Screen Adherence	Impact of Adherence on Outcomes of Colorectal Cancer Screening	Inadomi, John M.	VA HSR&D	Other: Revising IIR proposal	X		X				X
(2)	CRC Decision Tool	Colorectal Cancer Decision Tool: This study will examine the feasibility of using a previously developed and validated computerized colorectal cancer screening decision tool in the VA healthcare system.	Provenzale, Dawn; Pignone, Michael	AHRQ	PI identified				X	X		
(2)	CRC Messages	Tailored Messages for CRC Screening	Ferreira, Rosario M.	VA HSR&D	PI identified				X	X		
R21CA102418-01A1 **(2)**	TaMes for CRC	Tailored Messaging in Colorectal Cancer Screening (06/01/04 – 05/31/06)	Myers, Ronald E.	NCI	Proposal submitted				X	X		
(2)	CBC Screening	Community-Based Colorectal Cancer Screening	Ferreira, Rosario M.	NCI	Proposal resubmission 7/04				X	X		
Goal 3: Improve the quality of cancer care and reduce suffering and mortality among CRC patients in VA												
(3)	CRC Care Costs	Colorectal Cancer Care Costs: This is a CanCORS ancillary study that will identify what structure and process variables significantly improve outcomes and quality of care for lung and colorectal cancer patients.	Datta, Santanu K, Provenzale, Dawn	VA HSR&D (VA CanCORs)	Other: Pending approval from CanCORS Steering Committee	X	X	X				X
(3)	Tumor Registry	Validation of the VA tumor registry using data from the VISN 20 warehouse. Collaborative project between CRC QUERI & VIREC.	Dominitz, Jason	VA HSR&D	Funding approved						X	

Part IV. Management Plan
IV.1 Overview

CRC QUERI coordinators Dr. Kochevar, Dr. Bond, Ms. Leger, (Minneapolis), and Dr. Provenzale (Durham) jointly promote and manage relationships among clinical and research partners. We have roughly organized our activities into two arms: 1) Colorectal Cancer Screening and Follow-up and 2) Colorectal Cancer Care. Dr. Kochevar provides leadership and oversight to both arms. Drs. Kochevar and Bond are the subgroup leaders for the Colorectal Cancer Screening and Follow-up arm and Dr. Provenzale, with assistance from Dr. Fisher, is the subgroup leader for the Colorectal Cancer Care Arm. Ms. Leger (Administrative Coordinator) and Ms. Koets (our Assistant Implementation Research Coordinator) help with coordination and dissemination for both arms.

Management Functions and Processes:

Executive Committee: The EC meets bi-monthly by phone and annually in person. Together the EC share current research and practice trends and determine strategic direction. As we are evolving from our formative phase to a greater emphasis on implementation, the composition of the Executive Committee will be changing to reflect greater stakeholder representation. We have already added T. G. Patel, director of the PCS acute Care SHG Oncology program to the EC. A VISN CMO and a representative of the NCP have been invited. We are in the process of identifying a representative of OQP. We anticipate maintaining an EC comprised of three senior researchers, key stakeholders from PCS, OQP and VISN leadership as detailed above and the QUERI coordinators. We plan to recruit front line primary care and specialty providers for any remaining EC slots.

Research Leadership: To maintain and enhance the relationships we have developed with VA and non-VA researchers we are launching a Research Leadership (RL) group. While the EC will focus on the strategic direction of the QUERI and how it fulfills the needs of the VHA as an integrated health care system, the RL will focus on scientific advances in clinical practice, intervention studies and implementation research. Investigators will discuss their ongoing lines of research and update the QUERI Leadership on trends, evidence gaps and preliminary findings. Senior researchers rotating off the EC will form the core of the RL.

Core Leadership Group: The EC is a bit large for detailed strategic discussions. Thus, we have established a CRC QUERI Leadership Group (CRC-LG) comprised of active and senior EC who have their primary appointment in the VA. In addition, they represent leadership at each of our pilot or “lab” sites, Durham (Provenzale); Greater LA/Sepulveda (Yano); Portland (Helfand) and

Minneapolis (Kochevar, Bond). The CRC-LG meets bi-monthly by phone and considerably more often on an ad hoc basis.

Core-funded projects emerge in two ways. In the first, investigators submit brief proposals and funding requests, and executive committee members rate them according to priority, quality and feasibility. The second mechanism is more organic; we realize we absolutely need to know something to move forward, we can't wait for a typical grant funding cycle, and so we allocate resources and just do the work. Sometimes we can handle it within our core staff, other times we use subcontracts.

IIR, SDP, SDR. Proposed projects are reviewed by the leadership committee and targeted members of the Executive Committee. If a project is deemed to be very high priority, the Coordinating Center(s) expend considerable resources on proposal development and submission. We rarely try to prevent a submission, but do not expend resources on development of a low priority project. We have only had one case where an idea was so misguided we did not want it to go forward; in that case the member of the executive committee with the most expertise on the topic in question had a private, supportive talk with the affiliate investigator.

All affiliated and core investigators are aware of our plans and priorities. However, some are very interested in moving forward projects that we would place further back in the cue. We do not discourage such investigators; the project will make a contribution, and in the future the investigator may be interested in projects we deem to be more essential.

IV.2 Staff and Executive Committee

Since the previous reporting period, there have been several changes to the staff and Executive Committee. As cited earlier, Michelle van Ryn has stepped down as Research Coordinator and Laura Kochevar has been appointed Research Coordinator. Suzanne Leger has been appointed Administrative Coordinator in place of Krysten Halek. T.G. Patel, director of the PCS Acute Care SHG Oncology program has joined the executive committee. David Rothenberger has rotated off the EC.

Table 5. Staff Roster

Center Leadership								
Name	**Degrees**	**QUERI Role**	**Institution/Facility**	**Street Address**	**City, State, Zip**	**Telephone**	**Fax**	**E-mail**
Kochevar, Laura	PhD	Research Coordinator	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-5355	612-727-5699	Laura.Kochevar@med.va.gov
Bond, John	MD	Co-Clinical Coordinator	Minneapolis VAMC (111D)	One Veterans Drive	Minneapolis, MN 55417	612-467-4100	612-725-2248	John.Bond@med.va.gov
Provenzale, Dawn	MD, MSc	Co-Clinical Coordinator	Durham VAMC (152)	508 Fulton Street Building 16, Room 70	Durham, NC 27705	919-286-2287	919-416-5839	prove002@mc.duke.edu
Vacant		Implementation Research Coordinator		One Veterans Drive	Minneapolis MN 55417			
Koets, Nancy	MS, ABD	Assistant Implementation Research Coordinator	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis MN 55417	612-467-1148	612-727-5699	Nancy.Koets@med.va.gov
Leger, Suzanne	MPA	Administrative Coordinator	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-2785	612-727-5699	Suzanne.Leger2@med.va.gov
Executive Committee Membership								
Name	**Degrees**	**QUERI Role**	**Institution/Facility**	**Address**	**City, State, Zip**	**Telephone**	**Fax**	**E-mail**
Baxter, Nancy	MD, PhD	Executive Committee	University of Minnesota Cancer Center MMC 450	420 Delaware Street SE	Minneapolis, MN 55416	612-625-3288	612-626-4915	baxte025@umn.edu
Dominitz, Jason A.	MD, MHS	Executive Committee	VA Puget Sound Health Care System, Seattle Division (111GI)	1660 S. Columbian Way	Seattle, WA 98108-1597	206-764-2285	206-764-2232	Jason.Dominitz@med.va.gov
Helfand, Mark	MD	Executive Committee	Section of General Internal Medicine (P3-MED)	3710 SW US Veterans Hospital	Portland, OR 97207	503-494-4277	503-494-4551	helfand@ohsu.edu

				Road				
Myers, Ronald E.	PhD	Executive Committee	Thomas Jefferson University, Medical Office Building, Suite 400	1100 Walnut Street	Philadelphia, PA 19107	215-503-4085	215-503-9506	Ron.Myers@mail.tju.edu
Parkerton, Patricia	PhD	Executive Committee	Department of Health Services, UCLA School of Public Health	650 Charles Young Drive South, Room 41-295D, Box 951772	Los Angeles, CA 90095	310-825-2926	310-825-3317	parkert@ucla.edu
Partin, Melissa	PhD	Executive Committee	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-3841	612-727-5699	Melissa.Partin@med.va.gov
Patel, Thakor	MD, MACP	Executive Committee	Dept. of Veterans Affairs Medical Services (111A)	810 Vermont Ave. NW.	Washington, DC. 20420	202-273-8490	202-283-9142	tgpatel@2k.va.gov
Shannon, Jackilen	PhD	Executive Committee	Portland VA Research Foundation	3710 SW US Veterans Hospital Road	Portland, OR 97201	503-220-8262 x57285	503-273-5367	shannoja@ohsu.edu
van Ryn, Michelle	PhD, MPH	Executive Committee	U. of Minn. Dept. of Family Medicine & Comm. Health	925 Delaware St. SE. #220	Minneapolis, MN. 55414	612-625-9105	612-624-3037	vanry001@umn.edu
Vernon, Sally	PhD	Executive Committee	University of Texas Health Science Center-Houston Center for Health Promotion and Prevention Research	7000 Fannin, Suite 2560	Houston, TX 77030	713-500-9760	713-500-9750	Sally.w.vernon@uth.tmc.edu
Virnig, Beth	PhD, MPH	Executive Committee	University of Minnesota Box 729 Mayo	420 Delaware Street SE	Minneapolis, MN 55455	612-624-4426	612-624-8448	virni001@tc.umc.edu
Yano, Elizabeth M.	PhD, MSPH	Executive Committee	Center for the Study of Healthcare Provider Behavior, VA Greater Los Angeles Health Care System	16111 Plummer Street	Sepulveda, CA 91343-2036	818-895-9449	818-895-5838	Elizabeth.yano@med.va.gov

Other Key Center and Project Staff								
Name	**Degrees**	**QUERI Role**	**Institution/Facility**	**Address**	**City, State, Zip**	**Telephone**	**Fax**	**E-mail**
Ash, Joan S.	PhD	Affiliate Investigator	Department of Medical Informatics and Clinical Epidemiology, Oregon Health and Science University	3181 SW Sam Jackson Park Road	Portland, OR 97239-3098	503-494-4540	503-494-4551	ash@ohsu.edu
Burgess, Diana	PhD	Affiliate Investigator	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-4673	612-727-5699	Diana.burgess@med.va.gov
El-Serag, Hashem	MD, MPH	Affiliate Investigator	Houston Veterans Affairs Medical Center (39A)	2002 Holcombe Blvd.	Houston, TX 77030	713-794-8840		Hashem.El-Serag@med.va.gov
Etzioni, David	MD	Affiliate Investigator	University of California Los Angeles (UCLA)	911 Broxton Ave, 3rd Floor	Los Angeles, CA 90024	310-794-2257	310-794-3288	detzioni@ucla.edu
Ferreira, M. Rosario	MD, MAPP	Affiliate Investigator	Feinberg School of Medicine Northwestern University	676 N. St. Clair Street Suite 1400	Chicago, IL 60611	312-695-4497	312-695-3999	mr-ferraira@northwestern.edu
Fisher, Deborah	MD, MHS	Affiliate Investigator	Durham VAMC (152)	508 Fulton Street, Bldg 16	Durham, NC 27705	919-286-6936	919-416-5836	fish034@mc.duke.edu
Friedmann-Sánchez, Greta	PhD	Affiliate Investigator	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-4376	612-727-5699	Greta.Friedemann-Sanchez@med.va.gov
Gralnek, Ian	MD, MSHS	Affiliate Investigator	UCLA Center for the Study of Digestive Health Care Quality and Outcomes	11301 Wilshire Blvd	Los Angeles, CA 90073	310-268-3256	310-794-2908	igralnek@mednet.ucla.edu
Griffin, Joan	PhD	Affiliate Investigator	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-4232	612-725-2118	Joan.griffin2@med.va.gov
Hannum Rose, Julia	PhD	Affiliate Investigator	Case Western Reserve University School of Medicine	2500 MetroHealth Drive	Cleveland, Ohio 44109	216-778-2303	216-778-5935	Julia.Rose@med.va.gov

Harris, Linda	PhD	Affiliate Investigator	Health Communication and Informatics Research Branch, Behavioral Research Program Division of Cancer Control and Population Sciences National Cancer Institute	6130 Executive Boulevard EPN-4087A, MSC 7326	Bethesda, Maryland 20892-7326	301-496-7984	301-480-2198	harrisl@mail.nih.gov
Imperiale, Thomas F.	MD	Affiliate Investigator	Roudebush VA Medical Center Health Services Research and Development (11H)	1481 West 10th Street	Indianapolis, IN 46202	317-554-0000 x2887	317-554-0114	imperial@hsrd.va.iupui.edu
Inadomi, John M.	MD	Affiliate Investigator	VA Ann Arbor Healthcare Systems (111-D)	2215 Fuller Road	Ann Arbor, MI 48105	734-761-7981	734-761-7549	jinadomi@umich.edu
Lazovich, DeAnn	PhD	Affilate Investigators	Div of Epidemiology, University of Minnesota	Suite 300, 1300 S 2nd St	Minneapolis, MN 55454	612-624-1818	612-624-0315	lazovich@epi.umn.edu
Ling, Bruce	MD, MPH	Affiliate Investigator	VA Pittsburgh Center for Health Equity Research and Promotion	230 McKee Place Suite 600	Pittsburgh, PA 15213	412-688-6000		lingbs@upmc.edu
Morrison, Vicki	MD	Affiliate Investigator	Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-4135		morri002@umn.edu
Nelson, Douglas	MD	Affiliate Investigator	Minneapolis VAMC (111D)	One Veterans Drive	Minneapolis, MN 55417	612-467-4100	612-725-2248	nelso195@tc.umn.edu
Osarogiagbon, Raymond	MD	Affiliate Investigator	Amarillo VA Health Care System (504/111)	6010 Amarillo Blvd West	Amarillo, TX 79106	806-356-3809	806-356-3795	raymond.osarogiabon@med.va.gov
Patten, Sonia	PhD	Affiliate Investigator	Macalester College	1600 Grand Avenue	Saint Paul, MN 55105	651-696-6588	651-696-6116	patten@macalester.edu
Pignone, Michael	MD, MPH	Affiliate Investigator	University of North Carolina at Chapel Hill	5039 Old Clinic Bldg	Chapel Hill, NC 27599	919-966-2276		Michael_pignone@med.unc.edu
Rockwood, Todd	PhD	Affiliate Investigator	Division of Health Services Research, Policy & Administration University of Minnesota	420 Delaware St SE Mayo Mail Stop 729	Minneapolis, MN 55455	612-625-3993	612-624-2196	rockw001@tc.umn.edu
Sayer, Nina	PhD	Affiliate Investigator	Center for Chronic Disease Outcomes Research (152/2E), Minneapolis VAMC	One Veterans Drive	Minneapolis, MN 55417	612-467-4623	612-727-5699	Nina.sayer@med.va.gov

Soban, Lynn	RN, MPH	Affiliate Investigator	VA HSR&D COE for the Study of Healthcare Provider Behavior	16111 Plummer Street (152) Building 25	Sepulveda, CA 91343	818-891-7711 x9954	818-895-5838	lynn.soban@med.va.gov
Wallace, James		Project Staff	Portland VAMC	3710 SW US Veterans Hospital Rd, PO Box 1034	Portland, OR 97207	503-220-8262 x54794	503-494-4551	wallacej@ohsu.edu
Walter, Louise	MD	Affiliate Investigator	VA Medical Center – 181G	4150 Clement St.	San Francisco, CA. 94121	415-221-4810 X3052	415-750-6641	Louise.Walter@med.va.gov

YEAR 2005-2006 (FY-06) FUNDS FOR PROGRAM [X] PROJECT [ ]

PRINCIPAL INVESTIGATOR(S)
LAURA K. KOCHEVAR, PH.D.

TITLE OF PROJECT (Not to exceed 72 character spaces)
COLORECTAL CANCER QUALITY ENHANCEMENT RESEARCH INITIATIVE

PERSONNEL	ROLE IN PROGRAM	% EFFORT	CURRENT YEAR FUNDS	REQUESTED FUNDS
Laura K. Kochevar, Ph.D., GS13/4	Research Coordinator/Principal Investigator	50		53,473
TBN GS12/5	Implementation Research Coordinator	100		92,658
John Bond, MD	Clinical Coordinator	20		0
CCDOR Statistical Group GS13/6	Statisticians	10		11,343
CCDOR Data Group GS12-5	Programmers	20		18,532
Suzanne M. Leger GS11/2	Administrative Officer	100		70,489
Nancy Koets GS11/4	Implementation Assistant	50		37,518
(*Salary figures include 30% fringe for VA employees)*		Total		$284,013
CONSULTANT SERVICES				
EQUIPMENT (Justify any item over $3,000 on VA Form 10-1313-4)				
SUPPLIES (Itemize)				
General Supplies				$4,320
FedEx				$380
Educational Materials				$1,250
Software and Licenses				$1,125
		Total		$7,075
OTHER				
Research Services for LIPs and rapid response to stakeholder needs		Total		$8,912
TOTAL OPERATING EXPENSES				$300,000

VA FORM
JUN 1990 **10-1313-3**

(Kochevar and Bond)

ESTIMATED EXPENSES OF PROGRAM [ ] PROJECT [X]

DESCRIPTION	$ AMOUNT EACH YEAR				
	1ST	2ND	3RD	4TH	5TH
PERSONNEL	284,013				
CONSULTANT SERVICES	-				
EQUIPMENT	-				
SUPPLIES	7,075				
ALL OTHER EXPENSES	8,912				
TOTAL OPERATING EXPENSES	300,000				

Explain differences in the operating expenses between years.

JUSTIFICATION OF ITEMS PAGE 3

Budget justification begins on next page.

VA FORM JUN 1990 **10-1313-4** Kochevar

YEAR 2005-2006 (FY06) FUNDS FOR PROGRAM [X] PROJECT [ ]

PRINCIPAL INVESTIGATOR(S) DAWN PROVENZALE, MD				
TITLE OF PROJECT (Not to exceed 72 character spaces) COLORECTAL CANCER QUALITY ENHANCEMENT RESEARCH INITIATIVE				
PERSONNEL	ROLE IN PROGRAM	% EFFORT	CURRENT YEAR FUNDS	REQUESTED FUNDS
Dawn Provenzale, MD	Clinical Coordinator	20		0
Deborah Fisher, MD	Co- Coordinator	10		0
Teresa Day, GS11-1	Administrative Assistant	75		48,750
(*Salary figures include 30% fringe for VA employees)*		Total		$48,750
CONSULTANT SERVICES				
EQUIPMENT (Justify any item over $3,000 on VA Form 10-1313-4)				
SUPPLIES (Itemize) General Supplies		Total		$1,250
OTHER		Total		
TOTAL OPERATING EXPENSES				$50,000

VA FORM
JUN 1990 **10-1313-3** (Provenzale)

ESTIMATED EXPENSES OF PROGRAM ☒ PROJECT ☐

DESCRIPTION	$ AMOUNT EACH YEAR				
	1ST	2ND	3RD	4TH	5TH
PERSONNEL	48,750				
CONSULTANT SERVICES	-				
EQUIPMENT	-				
SUPPLIES	1,250				
ALL OTHER EXPENSES	-				
TOTAL OPERATING EXPENSES	50,000				

Explain differences in the operating expenses between years.

JUSTIFICATION OF ITEMS PAGE 3

Budget justification begins on next page.

VA FORM JUN 1990 **10-1313-4** (Provenzale)

Minneapolis Research Coordinating Center

Laura Kochevar, Ph.D. serves as the Research Coordinator for the CRC QUERI, providing direction and day-to-day oversight for all QUERI activities. She spends 50% of her time on CRC QUERI core matters, and has additional funding as principal and co-investigator of CRC QUERI research projects. Dr. Kochevar invests considerable effort in core-funded rapid-response work with stakeholders such as the advanced clinic access groups, OQP, PCS, the GI field advisory committee and the CMO/QMO workgroup and actively works to collect and synthesize incoming preliminary research findings for rapid conversion to clinical and management tools.

We are currently recruiting for an Implementation Research Coordinator.

Suzanne Leger is the QUERI Administrative Coordinator. She is responsible for assisting with day-to-day operations, staff supervision, dissemination and technical assistance activities. She assists in the coordination of research-affiliate activities and maintenance of the CRC QUERI website. She is our liaison to VACO and QUERI reporting and policy.

Nancy Koets, M.S., PsyD serves as the Assistant Implementation Research Coordinator. She will make a substantive contribution to patient-centered translations projects intended to promote best CDE practices as well as coordinate and assist with other implementation projects.

The CCDOR Statistics Group Led By David B. Nelson, Ph.D. will provide statistical support for pilot and diagnosis projects supported by the QUERI core.

CCDOR Data Group The CCDOR data group includes four experienced Systems Analysts with in depth knowledge of the VA administrative data systems, and extensive experience working with Medicare and other complex databases. They will provide both data and web page support for dissemination, pilot, and diagnosis projects supported by the QUERI core.

General Supplies. We request funds to purchase general office supplies (such as letterhead, notebooks, pens, pencils, paper, etc) and word-processing supplies (disks, printer cartridges, etc). These costs also incorporate historical costs associated with: SAS statistical license upgrades, maintenance and renewals; SAS/SPSS software licensing, maintenance and

upgrades; statistical software upgrades and maintenance for address manipulation, plotting, formatting, enhanced data analysis, and sample size manipulation. Additionally, we request funds for postage and federal express and the acquisition of various educational materials required during the year. Cost is based on a formula from past experience.

Funds for LIPs and Rapid-Response Projects. In addition to core staff time we occasionally need to contract with external vendors to satisfy stakeholder requests for information and technical assistance. This estimate is based on external consulting contracts from prior fiscal years and planned projects for FY 2006.

Minneapolis Clinical Coordinating Center

John Bond, M.D. is the Clinical Coordinator for CRC Screening and Diagnostic Follow-up and will provide direction and day-to-day management of the CRC QUERI Clinical Coordinating Center. Dr. Bond will provide .20 FTE during each year, contributed by the Minneapolis VAMC and VISN 23.

Durham Clinical Coordinating Center

Dawn Provenzale, M.D. is the Clinical Coordinator for CRC Treatment and will provide direction and day-to-day management of the CRC QUERI Co-Clinical Coordinating Center in Durham. Dr. Provenzale will provide .20 FTE during each year.

Deborah Fisher, M.D. will assist Dr. Provenzale with conducting and coordinating CRC QUERI Cancer Care Quality Improvement projects and will provide input into the CRC QUERI Leadership and Executive committees. Dr. Fisher will provide .10 FTE each year.

Teresa Day, Administrative Assistant (.75 FTE) will be hired to support the day-to-day operations of the Durham coordinating centers.

Appendix A. Acronym Lists

A.1 General Acronyms

Acronym	Full Name	Context
AC	Administrative Coordinator for a QUERI Center	QUERI
AGS	American Geriatrics Society	Private
AHRQ	Agency for Healthcare Research & Quality	Federal
AI	Associate Investigator Program	ORD
AMA	American Medical Association	Private
AO	Administrative Officer	ORD
ART	Annual Reporting Template	VA
Campbell	Campbell Collaboration	Private
CBOC	Community Based Outpatient Clinic	VA
CC	Clinical Coordinator for a QUERI Center	QUERI
CDA	Career Development Award	ORD
CDC	Centers for Disease Control and Prevention	Federal
CHF	Chronic Heart Failure QUERI Center	QUERI
CIO	Chief Information Officer	VA
CME	Continuing Medical Education	Generic
CMO	Chief Medical Officer	VISN
CMS	Centers for Medicare and Medicaid	Federal
CO	Central Office	VA
Cochrane	Cochrane Collaboration	Private
COE	Center of Excellence	HSRD
COLA	Cost of Living Allowance	Generic
CP	Concept Paper	VA
CPG Council	VA/DoD National Clinical Practice Guidelines Council (NCPGC)	VA
CPRS	Computerized Patient Record System	VA
CRADO	Chief Research and Development Officer	ORD
CRC	Colorectal Cancer QUERI Center	QUERI
CSP	Cooperative Studies Program	ORD
DHCP	Decentralized Hospital Computer Program	VA
DHHS	Department of Health and Human Services	Federal
DIWG	Data Issues Work Group	QUERI
DM	Diabetes Mellitus QUERI Center	QUERI
DoD	Department of Defense	Federal
DUSH	Deputy Under Secretary for Health	VA
EES	Employee Education System	VA
EBM	Evidence Based Medicine	Generic
EPC	Evidence-based Practice Center	AHRQ
EPOC	Effective Practice and Organization of Care Cochrane Group	Private
ERIC	Epidemiology Research and Information Center	HSRD
GRECC	Geriatric Research Education and Clinical Center	VA
HAIG	Health Analysis and Information Group	VA

Acronym	Full Name	Context
HERC	Health Economics Resource Center	HSRD
HIPAA	Health Insurance Portability and Accountability Act	Generic
HIV	HIV/AIDS QUERI Center	QUERI
HSR&D	Health Services Research and Development Service	HSRD
I&E	Implementation and Education Subcommittee (of NCPGC)	VA
IAA	Inter-Agency Agreement	Federal
IDP	Information Dissemination Program	ORD
IHD	Ischemic Heart Disease QUERI Center	QUERI
IIR	Investigator Initiated Research	HSRD
IoM	Institute of Medicine	Private
IPA	Inter-Governmental Personnel Act	VA
IRB	Institutional Review Board	Generic
IRC	Implementation Research Coordinator for a QUERI Center	QUERI
IRM	Information Resources Management	VA
JCAHO	Joint Commission on Accreditation of Healthcare Organizations	Private
LIP	Locally Initiated Project	HSRD
LOI	Letter of Intent	ORD
MDRC	Management Decision Research Center	HSRD
METRIC	Measurement Excellence and Training Resource Information Center	VA
MH	Mental Health QUERI Center	QUERI
MIRECC	Mental Illness Research, Education and Clinical Center	VA
MREP	Merit Review Entry Program	HSRD
NAC	National Advisory Council	QUERI
NCI	National Cancer Institute	Federal
NCPGC	National Clinical Practice Guidelines Council	VA
NCQA	National Committee for Quality Assurance	Private
NHS	National Health Service (United Kingdom)	International
NIA	National Institute of Aging	Federal
NIH	National Institutes of Health	Federal
NLB	National Leadership Board	VA
NLM	National Library of Medicine	Federal
NQF	National Quality Forum	Private
OI	Office of Information	VA
OQP	Office of Quality and Performance	VA
ORD	Office of Research and Development	VA
PADRECC	Parkinson's Disease Research, Education and Clinical Center	VA
PCS	Patient Care Services	VA
PHS	Public Health Service	Federal
PI	Principal Investigator	Generic
PIMS	Project Information Management System	ORD
QI	Quality Improvement	Generic
QMIC	Quality Management Integration Council	VA
QMO	Quality Management Officer	VISN
QoL	Quality of Life	Generic

Acronym	Full Name	Context
QUERI	Quality Enhancement Research Initiative	QUERI
QuIC	Quality Interagency Coordination Task Force	Federal
R&D	Research and Development	Generic/VA
R&M	Research and Methodology Committee	QUERI
RC	Research Coordinator for a QUERI Center	QUERI
RDIS	Research and Development Information System	HSRD
REAP	Research Enhancement Award Program	HSRD
RFA	Request for Applications	Generic
RORC	Rehabilitation Outcomes Research Center	HSRD/RRD
RRD	Rehabilitation Research and Development Service	ORD
RWJ	Robert Wood Johnson Foundation	Private
SAS	Statistical Analysis System	Private
SCI	Spinal Cord Injury QUERI Center	QUERI
SDP	Service Directed Project	QUERI
SDR	Service Directed Research	HSRD
SGIM	Society for General Internal Medicine	Private
SHG	Strategic Healthcare Group (within PCS)	VA
SOE	Strength of Evidence	Generic
SOTA	State of the Art Conference	HSRD
SPO	Special Projects Office	HSRD
SREB	Scientific Review and Evaluation Board	HSRD
SUD	Substance Use Disorder QUERI Center	QUERI
TA	Technology Assessment	Generic
TREP	Targeted Research Enhancement Program	HSRD
TRIP	Translating Research into Practice	Generic
USH	Under Secretary for Health	VA
VA	Department of Veterans Affairs	VA
VACO	Veterans Affairs Central Office	VA
VAMC	Veterans Affairs Medical Center	VA
VANTS	VA Nationwide Teleconferencing System	VA
VHA	Veterans Health Administration	VA
VHACO	Veterans Health Administration Central Office	VA
VIReC	Veterans Information Resource Center	HSRD
VISN	Veterans Integrated Service Network	VA
WOC	Without Compensation Appointment	VA

A.2 QUERI Center-Specific Acronyms

Acronym	Full Name
CDE	Complete Diagnostic Evaluation
CIRP	Comprehensive Implementation Research Process
CORI	Clinical Outcomes Research Initiative
CPGC	Clinical Practice Guidelines Council
CRC-LG	CRC QUERI Leadership Group
CRCS	Colorectal Cancer Screening
CRC SAFE	Colorectal Cancer Screening Assessment and Surveillance Data System
CS	Colonoscopy
DCBE	Double Contrast Barium Enema
DSC	Direct Screening Colonoscopy
FOBT	Fecal Occult Blood Test
FS	Flexible Sigmoidoscopy
GI ACA	GI Endoscopy Advance Clinic Access
GI FAC	VA GI Field Advisory Committee
GPRA	Government Performance and Results Act Program Evaluation Team
QCCC	Quality Cancer Care Consortium
RT	Recommended Treatment
USPSTF	US Preventive Services Task Force

Appendix B. Publication Abstracts

Project Label	Abstract
Core	Baxter NN, Rothenberger DA, Morris AM, Bullard KM. Adjuvant radiation for rectal cancer: do we measure up to the standard of care? An epidemiologic analysis of trends over 25 years in the United States. Diseases of the Colon & Rectum 48(1):9-15, Jan 2005. In the United States, adjuvant radiation therapy is currently recommended for most patients with rectal cancer. Conducted this population-based study to evaluate the rate of radiation therapy and the factors affecting its delivery. Used the Surveillance Epidemiology and End Results database to assess treatment of patients with nonmetastatic rectal cancer diagnosed over a 25-year period (1976 through 2000). Evaluated the rate of radiation therapy use and its timing (preoperative vs. postoperative) and the influence of factors such as tumor stage and grade; patient gender and race; and geographic location. In this 25-year period, 45,627 patients met our selection criteria. The rate of radiation therapy use increased dramatically over our selection criteria. The rate of radiation therapy use increased dramatically over time: from 17b percent of advanced-stage patients in 1976 to 65 percent in 2000 (P<0.0001). Until 1996, the increase was due almost entirely to postoperative radiation therapy. Since 1996, the rate of preoperative radiation therapy use has increased (P<0.0001) and the rate of postoperative radiation therapy use has begun to decline. Found after controlling for the year of the diagnosis that female patients, African Americans, older patients and patients with low-grade lesions were less likely to undergo radiation therapy (P<0.0001). Geographic location was also an important predictor of radiation therapy use. The use of radiation therapy for patients with rectal cancer has dramatically increased over the 25-year period studied, with a recent shift to the use of preoperative radiation therapy; however, in 2000, over 30 percent of patients with advanced-stage nonmetastatic rectal cancer did not undergo radiation therapy. Given the variation in radiation therapy use that was found to be due to demographic factors, access to adjuvant radiation therapy can be improved.
Core	Baxter NN, Virnig DJ, Rothenberger DA, Morris AM, Jesserun J, Virnig BA. Lymph node evaluation in colorectal cancer patients: a population-based study. Journal of the National Cancer Institute. 97(3): 219-25, Feb 2005. Adequate lymph node evaluation is required for proper staging of colorectal cancer and the number of lymph nodes examined is associated with survival. According to current guidelines, the recommended minimum number of lymph nodes examined to ensure adequate sampling is 12. Data was used from the National Cancer Institute's Surveillance, Epidemiology, and End Results program to determine the proportion of colorectal cancer patients in the United States who receive adequate lymph node evaluation. For 116,995 adults with colorectal adenocarcinoma, diagnosed from 1988 through 2001, who underwent radical surgery and did not receive neoadjuvant radiation, the number of lymph nodes were evaluated, the likelihood of receiving adequate lymph node evaluation (i.e., at least 12 lymph nodes examined), and the influence of tumor and patient factors on lymph node evaluation. All statistical tests were two-sided. Among all patients the median number of lymph nodes examined was nine. Only 37% of all patients received adequate lymph node evaluation. The proportion of patients receiving adequate lymph node evaluation increased from 32% in 1988 to 44% in 2001 (P(trend)>.00l, Cochran-Armitage test). Advanced tumor stage was statistically significantly associated with adequate lymph node evaluation (odds ratio [OR] of receiving adequate lymph node evaluation = 2.27, 95% [CI] = 2.18 to 2.35). Older patients (> or =

Project Label	Abstract
	712 years, OR = 0.45, 95% CI = 0.44 to 0.47) were less likely to receive adequate lymph node evaluation than younger patients, and those with left-sided (OR = 0.45, 95% CI = 0.44 to 0.47) or rectal (OR = 0.52, 95% CI = 0.50 to 0.54) cancers were less likely to receive adequate lymph node evaluation than patients with right-sided cancers. In all analyses, geographic location was an important predictor of adequate lymph node evaluation, which ranged from 33% to 53%, depending on geographic location, In 2001, the majority of patients with colorectal cancer still received inadequate lymph node evaluation. The association of demographic variables, particularly patient age and geographic location, with adequate lymph node evaluation indicates that local surgical and pathology practice patterns may affect adequacy of lymph node evaluation.
Core	Urbach DR, Baxter NN. Does it matter what a hospital is "high volume" for? Specificity of hospital volume-outcome associations for surgical procedures: analysis of administrative data. Quality & Safety in Health Care. 13(5): 379-83, Oct 2004. To determine whether the improved outcome of a surgical procedure in high volume hospitals is specific to the volume of the same procedure. Analysis of secondary data in Ontario, Canada. Patients having an oesophagectomy, colorectal resection for cancer, pancreaticoduodenectomy, major lung resection for cancer or repair of an unruptured abdominal aortic aneurysm between 1994 and 1999. Odds ratio for death within 30 days of surgery in relation to the hospital volume of the same surgical procedure and the hospital volume of the other four procedures. Estimates were adjusted for age, sex and comorbidity and accounted for hospital level clustering. With the exception of colorectal resection, 30 day mortality seemed to be inversely related not only to the hospital volume of the same procedure but also to the hospital volume of most of the other procedures. In some cases, the effect of the volume of a different procedure was stronger than the effect of the volume of the same procedure. For example, the association of mortality from pancreaticoduodenectomy with hospital volume of lung resection (odds ratio for death in hospitals with a high volume of lung resection compared with low volume 0.36, 95% confidence interval 0.23 to 0.57) was much stronger than the association of mortality from pancreaticoduodenectomy with hospital volume of pancreaticoduodenectomy (0.76, 0.44 to 1.32). The inverse association between high volume of procedure and risk of operative death is not specific to the volume of the procedure being studied.
Core	Bravo Gutierrez A, Madoff RD, Lowry AC, Parker SC, Buie WD, Baxter NN. Long-term results of anterior sphincteroplasty. Diseases of the Colon & Rectum. 47(5): 727-31; discussion 731-2, May 2004. This study was designed to evaluate the outcome of anterior sphincteroplasty in a large series with ten-year follow-up. The long-term results in 191 consecutive patients who were a median of ten years from sphincteroplasty were assessed. A questionnaire was administered to assess current bowel function, degree of incontinence and quality of life as measured by the Fecal Incontinence Quality of Life Scale. Subjective assessment of early outcome was available for most patients at a median follow-up of three years. During the follow-up period, three patients died and one developed severe dementia. Five patients required further surgery for incontinence and were considered failures. Of the remaining 182 patients, 130 (71 percent) returned a completed questionnaire. At ten years follow-up, 6 percent had no incontinence, 16 percent were incontinent of gas only, 19 percent had soiling only and 57 percent were incontinent of solid stool. Results worsened significantly between the assessments at three and ten years. The only significant predictors of a poor outcome were older age and fecal incontinence at three years. Preoperative anorectal physiology studies did not predict outcome. Scores on the Fecal Incontinence Quality of Life Scale were lower in those with fecal incontinence,

Project Label	Abstract
	indicating a porrer disease-specific quality of life. Only 40 percent of patients maintain fecal continence long-term after sphincteroplasty. Older patients and patients with poorer short-term function are more likely to have fecal incontinence at ten years. Incontinence at ten years had a negative effect on quality of life. Further research is needed to develop techniques to improve long-term continence in these patients.
Core	Morris AM, Billingsley KG, Baxter NN, Baldwin LM. Racial disparities in rectal cancer treatment: a population-based analysis. Archives of Surgery. 139(2): 151-5; discussion 156, Feb 2004. Hypothesized that there are significant racial disparities in delivery of care to rectal cancer patients. Examined differential surgical and radiation treatment for these patients and determined whether blacks were less likely than whites to undergo sphincter-sparing procedures, which are associated with a higher quality of life than sphincter-ablating procedures. Cross-sectional cohort study. The Surveillance Epidemiology and End Results database provided population-based data for rectal cancer patients who were diagnosed between 1988 and 1999, were older than 35 years and had no prior colorectal or other pelvic cancer. Using logistic regression, compared receipt and type of surgical therapy and radiation therapy, controlling for age, sex, year, geography, stage and anatomic location. Among 52,864 patients, 3,851 were black and 44,010 were white. Blacks were younger than whites and had more advanced disease (P<.001). Among patients who underwent operation, rates of sphincter-ablating procedure were 37% for white and 43% for blacks (adjusted odds ratio [AOR], 1.42; 95% confidence interval [CI], 1.23-1.65). Moreover, 53% of whites and 56% of blacks received no radiation therapy for stage II to III disease (AOR, 1.30; 95% CI, 1.15-1.47). Blacks with rectal cancer were diagnoses at a younger age and more advanced disease stage than whites, implying a need for more aggressive screening. After adjusting for stage and other covariates, surgical and radiation treatment also differed along racial lines. Data suggest that treatment disparities may contribute to differences in outcome among racial/ethnic groups with rectal cancer and they highlight the need for improving access to state-of-the-art surgical care for minority patients with rectal cancer.
Core	*Bond JH.* *Fecal occult blood test screening for colorectal cancer.* *Gastrointestinal Endoscopy Clinics of North America 12(1): 11-21, 2002.* In summary, high-quality scientific studies indicate that the use of the FOBT for colorectal cancer screening has a number of important advantages. The test is capable of detecting most early colorectal cancers and many advanced adenomas. It has been shown in randomized, controlled trials to reduce substantially colorectal cancer mortality and incidence. The FOBT is feasible, widely available, and acceptable to most individuals. It has a low up-front cost and is highly cost-effective. Combining annual FOBT with periodic flexible sigmoidoscopy seems to be an especially effective screening option. Limitations of FOBT screening include its low sensitivity for polyps, especially smaller ones. Some of the trials report a relatively low sensitivity for detecting cancers located in the distal colon. The test has a relatively low specificity, so there are many false-positive screens; and for it to be most effective, repetitive screening is necessary. Balancing these advantages and disadvantages, the evidence-based screening guidelines have concluded that FOBT screening has a major role to play in colorectal cancer control and a program of annual FOBT plus flexible sigmoidoscopy every 5 years is a preferred option for screening the asymptomatic, average-risk population for colorectal cancer. Short of doing direct colonoscopy screening for the entire at-risk population, the FOBT currently is the best available method of identifying asymptomatic,

Project Label	Abstract
	average-risk people most likely to benefit from colonoscopy.
CSP SC	*Nelson DB, McQuaid KR, Bond JH, Lieberman DA, Weiss DG, Johnston TK and the VA Cooperative Study Group #380.* *Procedural success and complications of large-scale screening colonoscopy.* *Gastrointest Endosc 55:307-14, 2002.* BACKGROUND: Indirect evidence and modeling analyses suggest that colonoscopy may be the most cost-effective way to screen the average-risk population for colorectal neoplasia. However, the success and safety of primary colonoscopic screening has not been prospectively evaluated in a multicenter trial. METHODS: Asymptomatic subjects age 50 to 75 years who had not undergone examination of the colon within 10 years were recruited from the general medicine clinics of 13 Department of Veterans Affairs Medical Centers. Eligible patients underwent colonoscopy by study coinvestigators, at which time all polyps were measured, photographed, and removed. Patients were contacted at 24 hours and 1 week to track procedure-related complications. RESULTS: Primary screening colonoscopy was performed in a cohort of 3196 asymptomatic subjects. A "good" preparation was reported in 81% of patients, and colonoscopy to the cecum was successful in 97.2% of cases. Mean insertion time to the cecum and total procedure times were 10.5 (8.7) and 30.6 (19.1) minutes, respectively. No preprocedural patient characteristics were identified that were predictive of an incomplete procedure. At least one polyp was resected in 1672 patients. There was no perforation and no death attributed to colonoscopy. Major morbidity considered to be definitely related to colonoscopy occurred in 9 of 3196 procedures (0.3%): lower GI bleeding requiring intervention (6), myocardial infarction and/or cerebrovascular accident (2), and thrombophlebitis (1). In subjects undergoing only diagnostic procedures, the major complication rate was 0.1%. CONCLUSIONS: Screening colonoscopy can be performed in multiple centers with a high degree of success and safety in large numbers of asymptomatic, average-risk men.
Core	*Rex DK, Bond JH, Winawer SJ, Levin TR, Burt RW, Johnson DA, Kirk LW, Litlin S, Lieberman DA, Waye JD, Church J, Marshall J, Riddell RH.* *Quality in technical performance of colonoscopy and the continuous quality improvement process for colonoscopy: Recommendations of the Multi-Society Task Force on Colorectal Cancer.* *Amer J Gastroenterol 2002;97:1296-1308.* Colorectal cancer is the second leading cause of cancer death in the United States. Colonoscopy and polypectomy have been effective in reducing the incidence of colorectal cancer in cohort studies, a case control study, a randomized controlled trial, and a trial of fecal occult blood testing. Colonoscopy and polypectomy are becoming increasingly prominent tools in both the diagnosis and the prevention of colorectal cancer. Colonoscopy and polypectomy are complex technical procedures that require training and experience to maximize accuracy and safety. These recommendations for the: technical performance of colonoscopy and for continuous quality improvement in colonoscopy were developed by the U.S. Multi-Society Task Force on Colorectal Cancer, comprised of representatives of the American College of Gastroenterology, The American College of Physicians-American Society of Internal Medicine (ACP-ASIM), The American Gastroenterological Association, and The American Society for Gastrointestinal Endoscopy. This task force was assembled in December, 2000 as a collaborative project of these four societies to address issues in colorectal cancer detection and prevention. The general focus of these recommendations is on the interaction of the quality of colonoscopy with the impact of colonoscopy on the detection and prevention of colorectal neoplasia. Thus, the recommendations do not address every

Project Label	Abstract
	diagnostic or therapeutic use of colonoscopy. These recommendations address the appropriate indications and intervals for colonoscopy and polypectomy, the technical perfomance of colonoscopy, biopsy and polypectomy, complications of colonoscopy, and the interaction of colonoscopists with pathologists. For each of these areas, continuous quality improvement targets are recommended. The purpose of this article is to provide evidence- and consensus-based standards for the performance of high quality colonoscopy, and to facilitate the development of constructive programs in continuous quality improvement. Continuous quality improvement is recommended as part of every colonoscopy program. This document is comprehensive with regard to quality improvement in colonoscopy. Other discussions of quality are available. The continuous quality improvement process can be expensive and time consuming for practitioners. Colonoscopy programs should prioritize which targets are most suitable for initial review based on their own perceived need, and extend the review process of other targets over a time period that ensures feasibility. The recommendations in the document are based on literature review and the consensus of the task force. Some of the targets presented require validation with regard to feasibility of achievement and whether they result in improved patient outcomes. Colonoscopists are encouraged to report their experience using these recommendations as a guide to quality, and whether feedback to colonoscopists resulted in improved adherence to target goals. The task force also has posed a series of key research questions in each of the above areas for consideration by endoscopists-investigators. In addition to promoting investigation to improve this important technology, the questions underscore the limited evidence base supporting certain of the recommended targets.
Core	*Saunders CS, Bond JH, Burt RW.* *How to increase colorectal cancer screening rates.* *Patient Care 36:32-43, 2002.* Should colonoscopy be the screening test of choice for all people, even those of average risk? Since colonoscopy is much more sensitive than fecal occult blood testing (FOBT), sigmoidoscopy, or barium enema, should these tests be used only as secondary screening measures? An intense debate is under way to answer this question. While many studies offer indirect evidence supporting the use of colonoscopy alone, there has not yet been a direct study that backs up this approach. Despite the lack of evidence, on July 1, 2001, Medicare approved coverage of colonoscopy screening for average-risk individuals starting at age 50, to be repeated every 10 years. Many insurers will probably be offering this coverage as well.
Core	*Bond JH.* *Colorectal cancer screening: The potential role of virtual colonoscopy.* *J Gastroenterol 37:92-96, 2002.* Virtual colonoscopy is a promising new technique that combines rapid spiral CT scanning of the abdomen with advanced computer programs capable of re-creating two- and three-dimensional views of the colon and rectum. Recent studies comparing this method with conventional colonoscopy show that virtual colonoscopy already is more accurate than barium enema X-ray studies for the detection of colorectal polyps, and that it approaches the accuracy of colonoscopy for diagnosing advanced lesions. Before virtual

Project Label	Abstract
	colonoscopy can be promoted for population-based screening for colorectal cancer, a number of issues discussed in this review need to be addressed. These include questions of accuracy, availability, acceptability, and cost-effectiveness.
Core	Winawer S. Fletcher R. Rex D. Bond J. Burt R. Ferrucci J. Ganiats T. Levin T. Woolf S. Johnson D. Kirk L. Litin S. Simmang C., for the U.S. MultiSociety colorectal Cancer Task Force. Gastrointestinal Consortium Panel. Colorectal cancer screening and surveillance: clinical guidelines and rationale-Update based on new evidence. Gastroenterology. 124(2):544-60, 2003 Feb. We have updated guidelines for screening for colorectal cancer. The original guidelines were prepared by a panel convened by the U.S. Agency for Health Care Policy and Research and published in 1997 under the sponsorship of a consortium of gastroenterology societies. Since then, much has changed, both in the research rature and in the clinical context. The present report summarizes new developments in this field and suggests how they should change practice. As with the previous version, these guidelines offer screening options and encourage the physician and patient to decide together which is the best approach for them. The guidelines also take into account not only the effectiveness of screening but also the risks, inconvenience, and cost of the various approaches. These guidelines differ from those published in 1997 in several ways: we recommend against rehydrating fecal occult blood tests; the screening interval for double contrast barium enema has been shortened to 5 years; colonoscopy is the preferred test for the diagnostic investigation of patients with findings on screening and for screening patients with a family history of hereditary nonpolyposis colorectal cancer; recommendations for people with a family history of colorectal cancer make greater use of risk stratification; and guidelines for genetic testing are included. Guidelines for surveillance are also included. Follow-up of postpolypectomy patients relies now on colonoscopy, and the first follow-up examination has been lengthened from 3 to 5 years for low-risk patients. If this were adopted nationally, surveillance resources could be shifted to screening and diagnosis. Promising new screening tests (virtual colonoscopy and tests for altered DNA in stool) are in development but are not yet ready for use outside of research studies. Despite a consensus among expert groups on the effectiveness of screening for colorectal cancer, screening rates remain low. Improvement depends on changes in patients' attitudes, physicians' behaviors, insurance coverage, and the surveillance and reminder systems necessary to support screening programs.
Core	Baron JA, Cole B, Sandler RS, Hallie R, Ahnen D, Bresalier R, McKeown-Eyssen G, Summers R, Rothstein R, Burke C, Snover D, Church TR, Allen JI, Beach M, Beck G, Bond JH, Greenberg ER, Marcon N, Mott L, Pearson L, Saibil F, van Stolk, for the Polyp Prevention Study Group. A randomized trial of aspirin as a chemopreventive agent against colorectal adenomas. N Engl J Med 2003; 348:891-99. BACKGROUND: Laboratory and epidemiologic data suggest that aspirin has an antineoplastic effect in the large bowel. METHODS: We performed a randomized, double-blind trial of aspirin as a chemopreventive agent against colorectal adenomas. We randomly assigned 1121 patients with a recent history of histologically documented adenomas to receive placebo (372 patients), 81 mg of aspirin (377 patients), or 325 mg of aspirin (372 patients) daily. According to the protocol, follow-up colonoscopy was to be performed approximately three years after the qualifying endoscopy. We compared the groups with respect to the risk of one or more neoplasms (adenomas or colorectal cancer) at least one year after randomization using generalized linear models to compute risk ratios and 95

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	percent confidence intervals. RESULTS: Reported adherence to study medications and avoidance of nonsteroidal antiinflammatory drugs were excellent. Follow-up colonoscopy was performed at least one year after randomization in 1084 patients (97 percent). The incidence of one or more adenomas was 47 percent in the placebo group, 38 percent in the group given 81 mg of aspirin per day, and 45 percent in the group given 325 mg of aspirin per day (global P=0.04). Unadjusted relative risks of any adenoma (as compared with the placebo group) were 0.81 in the 81-mg group (95 percent confidence interval, 0.69 to 0.96) and 0.96 in the 325-mg group (95 percent confidence interval, 0.81 to 1.13). For advanced neoplasms (adenomas measuring at least 1 cm in diameter or with tubulovillous or villous features, severe dysplasia, or invasive cancer), the respective relative risks were 0.59 (95 percent confidence interval, 0.38 to 0.92) and 0.83 (95 percent confidence interval, 0.55 to 1.23). CONCLUSIONS: Low-dose aspirin has a moderate chemopreventive effect on adenomas in the large bowel.
Core	Bond JH. Colon polyps and cancer. Endoscopy. 35(1):27-35, 2003 Jan. A large number of studies published last year in peer-reviewed medical journals help to better define the advantages and limitations of the different options for colorectal cancer screening. Direct colonoscopy screening appears to have the greatest potential to markedly reduce both the incidence and mortality of colorectal cancer, but many obstacles limiting its widespread use in the general at-risk population still exist, and many questions remain incompletely answered. Recent studies stress the fact that finding and resecting advanced adenomatous polyps, and thereby preventing cancer, is becoming a primary objective of screening programs. Several papers also show the potential of emerging new methods of screening for specific markers in stool and for imaging the colon with computed-tomographic colonography (virtual colonoscopy). Other important publications highlighted in this review deal with the diagnosis of colorectal neoplasia, familial colorectal cancer, colorectal polyps and the adenoma-carcinoma sequence, and new and novel methods of improving the efficiency and safety of colonoscopic polypectomy.
Core	Bond JH. GI Consultation: Colorectal cancer. Emergency Medicine 2002;34:38-43. Review of the latest findings on the accuracy and cost-effectiveness of the primary colorectal cancer screening tools—fecal occult blood tests, flexible sigmoidoscopy, double-contrast barium enema, and colonoscopy—used alone or in combination.
Core	Lewis M, Bond JH. The Gastroenterologists: A biography of John H. Bond, M.D. Journal of Clinical Gastroenterology 2003;36:289-290. *Intro to article:* When I last talked to John H. Bond, M.D., before preparing this biography, it was at the Northwest Airlines Club at LaGuardia Airport in New York City. You would have thought that I was his long lost brother or college classmate. This truly describes the warmth and friendliness of this wonderful physician and human being. You always feel comfortable with him, and John always has

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	plenty of time for everyone. John Bond was born in Fargo, North Dakota in 1940 where his mother's family owned part of the local newspaper, the largest in the state, and his maternal grandfather was its editor. His father was an internist in a large subspecialty clinic, and his paternal grandfather was a schoolteacher, professional baseball player, and later ran the largest orphanage/adoption agency in the state of North Dakota…
Core	Bond JH. Update on colorectal polyps: Management and follow-up surveillance. Endoscopy 35:35-40, 2003. A large number of studies published last year in peer-reviewed medical journals help to better define the advantages and limitations of the different options for colorectal cancer screening. Direct colonoscopy screening appears to have the greatest potential to markedly reduce both the incidence and mortality of colorectal cancer, but many obstacles limiting its widespread use in the general at-risk population still exist, and many questions remain incompletely answered. Recent studies stress the fact that finding and resecting advanced by preventing cancer, is becoming a primary objective of screening programs. Several papers also show the potential of emerging new methods of screening for specific markers in stool and for imaging the colon with computed-tomographic colonography (virtual colonoscopy). Other important publications highlighted in this review deal with the diagnosis of colorectal neoplasia, familial colorectal cancer, colorectal polyps and the adenoma-carcinoma sequence, and new and novel methods of improving the efficiency and safety of colonoscopic polypectomy.
Wright County	Church TR, Yeazel MW, Jones RM, Kochevar LK, Watt GD, Mongin SJ, Cordes JE, Engelhard D. A randomized trial of direct mailing of fecal occult blood tests to increase colorectal cancer screening. Journal of the National Cancer Institute. 96(10): 770-80, May 2004. Although colorectal cancer screening by suing a fecal occult blood test (FOBT), flexible sigmoidoscopy, colonoscopy or barium enema x-ray reduces the incidence of and death from CRC, the rate of CRC screening in the general population is low. Conducted a randomized trial consisting of direct mailing FOBT kits to increase CRC screening among residents of Wright County, Minnesota, a county in which CRC screening was promoted. At baseline, mailed a questionnaire about CRC screening to a random sample of Wright County residents aged 50 years or older who were randomly selected from the Minnesota State Driver's License and Identification Card database (estimated N = 1451). The sample was randomly allocated into three equal subgroups: one group (control) received only the questionnaire, one group received FOBT kits by direct mail with reminders, and one group received FOBT kits by direct mail without reminders. Study participants were sent a follow-up questionnaire one year after baseline. Used the responses to the questionnaires to estimate the one-year change in self-reported screening rates in each group and the differences in the changes among the groups, along with the associated bootstrap 95%confidence intervals (CIs). At baseline, the estimated response rate was 86.5%, self-reported adherence to FOBT guidelines was 21.5%, and overall adherence to any CRC screening test guidelines was 55.8%. he one-year rate changes in absolute percentage for self-reported adherence to FOBT use were 1.5% (95% CI = -2.9% to 5.9%) for the control group, 16.9% (95% CI = 11.5% to 22.3%) for the direct-mail-FOBT-with-no-reminders group, and 23.3% (95% CI = 17.2% to 29.3%) for the direct-mail-FOBT-with-reminders group. The one-year rate changes for self-reported

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	adherence to any CRC screening test wee 7.8% (95% CI = 3.2% to 12.0%) for the control group, 13.2% (95% CI = 8.4% to 18.2%) for the direct-mail-FOBT-with-no-reminders group, and 14.1% (95% CI = 9.1% to 19.1%) for the direct-mail-FOBT-with-reminders group. Direct mailing of FOBT kits combined with follow-up reminders promotes more rapid increases in the use of FOBT and nearly doubles the increase in overall rate of adherence to CRC screening guidelines in a general population compared with a community-wide screening promotion and awareness campaign.
Core	Ioannou GN, Chapko MK, Dominitz JA. Predictors of colorectal cancer screening participation in the United States. American Journal of Gastroenterology 2003;98(9):2082-91. OBJECTIVE: Our aim was to identify predictors of colorectal cancer screening in the United States and subgroups with particularly low rates of screening. METHODS: The responses to a telephone-administered questionnaire of a nationally representative sample of 61,068 persons aged >/=50 yr were analyzed. Current screening was defined as either sigmoidoscopy/colonoscopy in the preceding 5 years or fecal occult blood testing (FOBT) in the preceding year, or both. RESULTS: Overall, current colorectal cancer screening was reported by 43.4% (sigmoidoscopy/colonoscopy by 22.8%, FOBT by 9.9%, and both by 10.7%). The lowest rates of screening were reported by the following subgroups: those aged 50-54 yr (31.2%), Hispanics (31.2%), Asian/Pacific Islanders (34.8%), those with education less than the ninth grade (34.4%), no health care coverage (20.4%), or coverage by Medicaid (29.2%), those who had no routine doctor's visit in the last year (20.3%), and every-day smokers (32.1%). The most important modifiable predictors of current colorectal cancer screening were health care coverage (OR = 1.7, 95% CI = 1.5-1.9) and a routine doctor's visit in the last year (OR = 3.5, 95% CI = 3.2-3.8). FOBT was more common in women than in men (OR = 1.8, 95% CI = 1.6-2.0); sigmoidoscopy/colonoscopy was more common in Hispanics (OR = 1.4, 95% CI = 1.1-1.7) and Asian/Pacific Islanders (OR = 2.4, 95% = CI 1.5-3.9) relative to whites, in persons without routine doctor's visits in the preceding year (OR = 3.3, 95% CI = 2.8-4), and in persons with poor self-reported health (OR = 1.3, 95% CI = 1.2-1.5). CONCLUSIONS: Interventions should be developed to improve screening for the subgroups who reported the lowest screening rates. Such interventions may incorporate individual screening strategy preferences.
Core	Ko CW, Dominitz JA, Nguyen TD. Fecal occult blood testing in a general medical clinic: comparison between guaiac-based and immunochemical tests. Am J Med 2003;115:111-114. PURPOSE: Guaiac-based fecal occult blood tests are limited by poor patient compliance, and low sensitivity, specificity, and positive predictive value. Newer immunochemical-based tests are designed to improve accuracy and patient compliance. We compared patient compliance and the test characteristics of these two types of tests. METHODS: The laboratory outcomes associated with use of different fecal occult blood tests were examined in a Veterans Affairs-based general medicine clinic that was divided into two firms with similar patient and provider characteristics. Tests were ordered for colorectal cancer screening or for symptom evaluation. Patients were given one of the two tests depending on their firm. The completion and positivity rates, time to test completion, completion of diagnostic follow-up, and positive predictive values were compared. RESULTS: The percentage of returned test cards was similar between the two groups (47% [1369/2964] for guaiac-based tests vs. 48% [1410/2965] for immunochemical-based tests) as was the positivity rate (9.0% [122/1396] and [128/1410] for both groups). In patients with positive tests who underwent further colon evaluation, the proportion with adenomas was similar between groups (59% [38/64] vs. 58% [40/69]). However, 17% (12/69) with a positive

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	immunochemical-based test had an adenoma >1 cm or a colorectal malignancy, versus 30% (19/64) for guaiac-based tests (P = 0.09). CONCLUSION: Overall, immunochemical-based and guaiac-based fecal occult blood tests had comparable performance. However, although immunochemical-based testing is reported to be easier for patients than guaiac-based testing, we found that patients were no more likely to return cards for analysis. The similar positive predictive value and additional cost of immunochemical-based tests call into question their utility in general practice.
Core	Selinger RRE, Norman S, Dominitz JA. Failure of health care professionals to accurately interpret fecal occult blood tests. Am J Med 2003;114:64-7. Although colorectal cancer is the second leading cause of death due to cancer in the United States, mortality has been declining, in part because of earlier detection. Guaiac-based fecal occult blood testing is used widely in screening for colorectal cancer. It has been shown to reduce the incidence of cancer and mortality in randomized clinical trials and is recommended by many professional organizations. Fecal occult blood testing allows early detection of colorectal cancer or premalignant polyps at a treatable stage. However, its cost-effectiveness in asymptomatic patients depends on several factors, including sensitivity, specificity, and cost. Early detection of colorectal cancer also relies on appropriate performance of the test. When inexperienced personnel interpret test cards, the rate of positivity increases fourfold, whereas the positive predictive value decreases considerably. Although fecal occult blood testing has been shown to improve outcomes in rigorously controlled trials, its actual effectiveness in general practice has not been demonstrated. The purpose of this analysis was to determine the proportion of health care providers who perform and interpret fecal occult blood testing inaccurately in a U.S. health care setting, with the goal of identifying target groups in which further education is needed.
Core	Dominitz JA, Eisen GM, Baron TH, Goldstein JL, Hirota WK, Jacobson BC, Johanson JF, Leighton JA, Mallery JS, Raddawi HM, Vargo JJ 2nd, Waring JP, Fanelli RD, Wheeler-Harbough J, Faigel DO. Complications of colonoscopy. Gastrointest Endosc.2003; 57(4):441-5. Complications of colonoscopy are rare but can be serious and life threatening. In a study involving over 25,000 diagnostic colonoscopies, the overall complication rate (primarily bleeding and perforation) was reported to be 0.35%, which is similar to the 0.3% rate reported in a recent prospective study in 3196 patients. Colonoscopy with polypectomy carries a higher rate of up to 2.3%. However, this compares favorably with surgical open transabdominal colotomy and polypectomy that carry an overall complication rate of 14% to 20% and a 5% mortality rate. True rates of complications in the community setting are difficult to determine because reports of complication rates tend to come from centers with extensive experience. In addition, the latest risk of colonoscopy and polypectomy may be lower because the equipment, electrosurgical techniques, and experience have improved. Studies of screening colonoscopy in asymptomatic individuals reported major complication rates of 0.2% to 0.3% consisting of bleeding, perforation, myocardial infarction, and cerebrovascular accidents. With the introduction of large multicenter databases, such as the CORI (Clinical Outcomes Research

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	Initiative) project, better estimates of complications should be available in the future. However, although more accurate data may be obtained for immediate postprocedure complications, late complications may still be underestimated because of under-reporting. There are several methods of colonoscopic polypectomy, including cold biopsy, hot biopsy (i.e., biopsy with cautery), and snare (with and without electrocautery). Argon plasma coagulation has also been used to supplement piecemeal snare polypectomy of large sessile polyps. Complications of colonoscopic polypectomy include the same complications of diagnostic colonoscopy. In addition, complications directly related to the polypectomy include acute or delayed hemorrhage, perforation at the site of polypectomy, and postpolypectomy coagulation syndrome. Sedation-related complications are discussed in the guideline on upper GI endoscopy.
ACG GI	Fisher DA, Jeffreys A, Grambow SC, Provenzale D. Mortality and follow-up colonoscopy after colorectal cancer. Am J Gastroenterol 2003;98:901-906. OBJECTIVE: There have been no studies that demonstrate surveillance colonoscopy decreases mortality in patients with a history of colorectal cancer. The purpose of this study was to compare the mortality of patients with colorectal cancer who received at least one colonoscopy after their diagnosis with patients who had no further procedures after adjusting for age, race, chemotherapy, radiation therapy, and comorbidity using the national Veterans Affairs (VA) databases. METHODS: We studied a cohort of 3546 patients within the VA national databases with a new diagnosis of colorectal cancer during fiscal year 1995-1996. Patients with inflammatory bowel disease, metastatic disease at presentation, or who died within 1 yr of initial diagnosis were excluded. We collected data for demographics, comorbidities, colonoscopies, chemotherapy, and radiation therapy. The primary outcome was adjusted 5-yr mortality. RESULTS: In the adjusted analysis, the risk of death was decreased by 43% (hazard ratio = 0.57, 95% CI = 0.51-0.64) in the group who had at least one follow-up colonoscopy compared with patients who had no follow-up colonoscopies. CONCLUSIONS: This study strongly supports a mortality benefit for follow-up colonoscopy in patients with a history of nonmetastatic colorectal cancer.
Race & Screen	Fisher DA, Dougherty K, Martin C, Galanko J, Sandler RS, Provenzale D. Race and colorectal cancer screening. Gastroenterology 2003;124:A-82. PURPOSE: Population-based data document marked differences in colorectal cancer (CRC) mortality by race. Considerable evidence demonstrates that screening for CRC reduces cancer deaths. Racial differences in CRC mortality could be due to differences in screening rates by race. The purpose of this study was to determine if colorectal cancer screening rates are different between blacks and whites while controlling for potential confounders. METHODS: We used logistic regression modeling to analyze data from the North Carolina Colon Cancer Study, a population-based case-control study. Only data from the control subjects (those without CRC) were included in this study. We defined “current” for CRC screening by published guidelines. Subjects were excluded if they were younger than age 50 or had tests performed for symptoms/problems. Race was a priori included in the model. We developed the adjusted model by first including predictor variables with a p value <0.1 in univariate analysis and then by stepwise backward regression. We chose p<0.05 as the level of significance for the model. RESULTS: This study included 598 control subjects. The average age was 67, 51% were men and 51% white. Overall 50% of the respondents were current with CRC screening. The logistic regression model included race (black vs. white), age (50-59, 60-69, ³70), having a regular doctor (yes, no) and participation in general

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	medical exams (yes, no). Having a regular doctor and participation in a general medical exam were significantly associated with current screening status with an adjusted OR (95% CI) of 3.8 (1.7-8.3) and 3.7 (2.1-6.7) respectively. Older age was a significant predictor of current screening status with an adjusted OR (95% CI) of 2.9 (1.7-4.8) for those 60-69 compared to respondents 50-59 and OR 3.2 (1.9-5.5) for those 70 and older compared to respondents 50-59. After adjusting for age, having a regular doctor and participation in general medical exams, race was not significantly associated with current CRC screening status,with an OR of 1.1 (95% CI 0.7-1.6). CONCLUSIONS: 1) Overall CRC screening rates were low 2) Race was not a significant determinant of screening behavior and therefore does not explain the racial disparity in survival 3) Older age, having a regular doctor and participating in general medical exams were significant predictors of CRC screening. This study supports the importance of the primary care setting in CRC screening behavior and suggests that interventions at that level would have broad impact.
Core	Fisher DA, Allan M, Martin C, Galanko J, Sandler RS, Provenzale D. Predictors of colorectal cancer screening behavior. Gastroenterology 2003;124:A-621. PURPOSE: Colorectal cancer (CRC) screening is recommended because it has been shown to reduce CRC deaths, but actual screening rates in national surveys are low. Predictors of CRC screening behavior may be different for the veterans than the general population because of reduced financial barriers within the VA (Veterans Affairs) healthcare system. The purpose of this study was to examine the association between other health behavior: routine general physicals, eye exams and dental exams and participation in CRC screening among veterans while controlling for potential confounders including age, race, having health insurance, income and education level. METHODS: We used logistic regression modeling to determine the predictors of CRC screening participation for 502 male veteran patients with colorectal cancer who were enrolled in a national cross sectional study of risk factors for presenting with late stage colorectal cancer. We defined “current” for CRC screening by published guidelines. RESULTS: The mean age was 67, 79% were white and 16% black. The majority, 71%, were high school graduates, 84% reported less than $30,000/year income and 65% had health insurance. Only 40% of veterans in this sample had received any CRC screening test in the previous 10 years and only 31% were compliant with current guidelines. Men with a history of a general medical exam were twice as likely to have participated in CRC screening (odds ratio (OR) 2.2 95% confidence interval (CI) 1.3-3.5) and men who had undergone PSA testing were more than three times as likely to have participated in CRC screening (OR 3.7, 95% CI 2.3-5.7). Age, race, having health insurance, income and education level were not significantly associated with current CRC screening status. CONCLUSIONS: 1) Colorectal cancer screening rates were low in this VA population 2) Participation in a general medical exams and other cancer screening was predictive of participation in CRC screening while socioeconomic factors were not. Measures to increase patient attendance at health maintenance visits may improve the CRC screening rate within the VA system. Routine visits for dental and eye care may provide an untapped opportunity to encourage other preventative behavior such as CRC screening participation.
ACG GI	Fisher DA, Martin C, Galanko J, Sandler RS, Provenzale D. Colorectal cancer: risk factors for advanced disease. Gastroenterology 2003;124:(4):A-79. PURPOSE: Colorectal cancer (CRC) is curable if diagnosed in an early stage but has a five-year survival of only 14%-67% at more

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	advanced stages. The goal of this study was to identify prognostic factors of late stage CRC, particularly those that are modifiable, including smoking, access to care and health seeking behavior. METHODS: The Colorectal Cancer - Risk Factors for Advanced Disease study was conducted at 15 VA (Veterans Affairs) medical centers and included consecutive patients between the ages of 40 and 85 with a first diagnosis of histologically proven colon or rectal cancer between July 1, 1997 and January 1, 2001. Data were obtained by phone interview. A total of 683 patients were asked about income, health insurance, sources of health care, health status, history of cancer screening, physical activity, tobacco use, family history and occupation. The primary outcome was stage at presentation: early (Dukes stage A or B) and late (Dukes stage C or metastatic). We used the chi square test for nominal variables and chi square test for trend for ordinal variables to examine the relationship between potential risk factors for early versus advanced stage disease. Predictors with a p value <0.1 in univariate analysis were considered in the logistic regression model. RESULTS: Five hundred fifty-two (552) respondents had stage data available and were included in this analysis. Approximately 43% of the sample presented with late stage CRC. In univariate analysis, lacking a usual source of health (doctor's office or clinic), lack of participation in any CRC screening test in the last 10 years and increasing NSAID use over the previous five years (none, occasional, regular) was associated with late stage CRC. In the logistic regression model, only lacking a usual source of healthcare was associated with late stage CRC with an odds ratio (95% confidence intervals) of 2.8 (1.6-4.7). Over 15% of the study sample lacked a usual source of care. For 77% of the patients with a usual source of care, the care was received at a VA. CONCLUSIONS: A considerable proportion, 43%, of veterans presented with late stage CRC. The only independent predictor of late stage disease was lacking a usual source of healthcare. This is a potentially modifiable risk factor, as previous research has demonstrated improvement in healthcare quality and patient satisfaction within the VA by increasing access to primary care at the expense of acute services. This study supports previous work that access to care is an important predictor of CRC outcomes.
CRC Neo	Imperiale TF, Wagner DR, Lin CY, Larkin GN, Rogge JD, Ransohoff DR. Using risk for advanced proximal colonic neoplasia to tailor endoscopic screening for colorectal cancer. Ann Int Med 2003; 139: 959-965. BACKGROUND: Colonoscopic screening for colorectal cancer has been suggested because sigmoidoscopy misses nearly half of persons with advanced proximal neoplasia. OBJECTIVE: To create a clinical index to stratify risk for advanced proximal neoplasia and to identify a subgroup with very low risk in which screening sigmoidoscopy alone might suffice. DESIGN: Cross-sectional study. SETTING: A company-based program of screening colonoscopy for colorectal cancer. PATIENTS: Consecutive persons 50 years of age or older undergoing first-time screening colonoscopy between September 1995 and June 2001. MEASUREMENTS: A clinical index with 3 variables was created from information on the first 1994 persons. Points were assigned to categories of age, sex, and distal findings. Risk for advanced proximal neoplasia (defined as an adenoma 1 cm or larger or one with villous histology, severe dysplasia, or cancer) was measured for each score. The index was tested on the next 1031 persons from the same screening program. RESULTS: Of 1994 persons, 67 (3.4%) had advanced proximal neoplasia. A low-risk subgroup comprising 37% of the cohort had scores of 0 or 1 and a risk of 0.68% (95% CI, 0.22% to 1.57%). Among the validation group of 1031 persons, risk for advanced proximal neoplasia in the low-risk subgroup (comprising 47% of the cohort) was 0.4% (upper confidence limit of 1.49%). Application of this index detected 92% of persons with advanced proximal neoplasms and, if applied following screening sigmoidoscopy, could reduce the need for colonoscopy by 40%. The marginal benefit of colonoscopy among low-risk persons was small: To detect 7 additional persons with advanced proximal neoplasia, 1217 additional colonoscopies would be required. CONCLUSIONS: This clinical

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	index stratifies the risk for advanced proximal neoplasia and identifies a subgroup at very low risk. If it is validated in other cohorts or groups, the index could be used to tailor endoscopic screening for colorectal cancer.
Wright County	Yeazel MW, Church TR, Jones RM, Kochevar LK, Watt GD, Cordes JE, Engelhard D, Mongin SJ. Colorectal cancer screening adherence in a general population. Cancer Epidemiology, Biomarkers & Prevention. 13(4): 654-7, Apr 2004. The article describes the self-reported colorectal cancer (CRC) screening adherence rates of adults, aged 50 years and older, living in five nonurban Minnesota counties. During the year 2000, 1,693 eligible respondents, aged 50years and older, from a randomly selected sample completed a survey assessing CRC screening adherence (approximately 86.3% response). The survey allowed differentiation between the four CRC screening modalities but did not differentiate between screening and diagnostic testing. Adjustment for nonresponse was performed using a version of Horvitz-Thompson weighting accounting for unknown eligibility. 24.5% of respondents had a fecal occult blood test within 1 year of the survey, 33.8% had flexible sigmoidoscopy within 5 years, 29.3% had a colonoscopy within 10 years, and 13.7% had a barium enema within the last 5 years. Overall, 55.3% of respondents reported testing by any modality; thus, 44.7% were not adherent to screening guidelines. This study improves on previous attempts to characterize CRC screening adherence by assessing all four modalities of screening as a recommended by current screening guidelines, by focusing on nonadherence, and by rigorously accounting for nonresponse. This study confirms that nearly half of the population remains unscreened by any method.
Core	*Myers RE. Turner B. Weinberg D. Hauck WW. Hyslop T. Brigham T. Rothermel T. Grana J. Schlackman N.* *Complete diagnostic evaluation in colorectal cancer screening: research design and baseline findings.* *Preventive Medicine. 33(4):249-60, 2001 Oct.* BACKGROUND: While indicated by guidelines, complete diagnostic evaluation, or CDE (i.e., colonoscopy or combined flexible sigmoidoscopy plus barium enema X ray), is often not recommended and performed for persons with an abnormal screening fecal occult blood test (FOBT) result. We initiated a randomized trial to assess the impact of a physician-oriented intervention on CDE rates in primary care practices. METHODS: In 1998, we identified 1,184 primary care physicians (PCPs) in 584 practices whose patients received FOBTs that are mailed annually by a managed care organization screening program. A total of 470 PCPs in 318 practices completed a baseline survey. Practices were randomly assigned either to a Control Group (N = 198) or to an Intervention Group (N = 120). Control Group practices received the screening program. Intervention Group practices received the screening program and the intervention (i.e., CDE reminder-feedback plus educational outreach). Practice CDE recommendation and performance rates are the primary outcomes to be measured in the study. RESULTS: Baseline CDE recommendation and performance rates were low and were comparable in Control and Intervention Group practices (54 to 57% and 39 to 40%, respectively). PCPs in the practices tended to view FOBT screening and CDE favorably, but had concerns about screening efficacy, time involved in CDE, and patient discomfort and adherence. Control Group physicians were more likely than Intervention Group physicians to believe that a mail-out FOBT screening program helps in the practice of medicine. CONCLUSIONS: We were able to enroll a high proportion of targeted primary care practices, measure practice characteristics and CDE rates at baseline, and develop and implement the intervention. Study outcome analyses will take into account baseline differences in practice characteristics.

Project Label	Abstract
CRC DE	Turner B, Myers RE, Hyslop T, Hauck WW, Weinberg D, Brigham T, Grana J, Rothermel T, Schlackman N. Physician and Patient Factors Associated with Ordering a Colon Evaluation After a Positive Fecal Occult Blood Test. Journal of General Internal Medicine 18:357-363, 2003. OBJECTIVE: Successful colorectal cancer screening relies in part on physicians ordering a complete diagnostic evaluation of the colon (CDE) with colonoscopy or barium enema plus sigmoidoscopy after a positive screening fecal occult blood test (FOBT). DESIGN: We surveyed primary care physicians about colorectal cancer screening practices, beliefs, and intentions. At least 1 physician responded in 318 of 413 (77%) primary care practices that were affiliated with a managed care organization offering a mailed FOBT program for patients aged >/=50 years. Of these 318 practices, 212 (67%) had 602 FOBT+ patients from August through November 1998. We studied 184 (87%) of these 212 practices with 490 FOBT+ patients after excluding those judged ineligible for a CDE or without demographic data. Three months after notification of the FOBT+ result, physicians were asked on audit forms if they had ordered CDEs for study patients. Patient- and physician-predictors of ordering CDEs were identified using logistic regression. MEASUREMENTS AND MAIN RESULTS: A CDE was ordered for only 69.5% of 490 FOBT+ patients. After adjustment, women were less likely to have had CDE initiated than men (adjusted odds, 0.66; confidence interval, 0.44 to 0.97). Physician survey responses indicating intermediate or high intention to evaluate a FOBT+ patient with a CDE were associated with nearly 2-fold greater adjusted odds of actually initiating a CDE in this circumstance versus physicians with a low intention. CONCLUSIONS: Primary care physicians often fail to order CDE for FOBT+ patients. A CDE was less likely to be ordered for women and was influenced by physician's beliefs about CDEs.
CRC DE	Baig N, Myers RE, Turner BJ, Grana J, Rothermel T, Schlackman N, Weinberg DS. Physician-reported reasons for limited follow-up of patients with a positive fecal occult blood test screening result. American Journal of Gastroenterology. 98(9):2078-81, 2003 Sep. OBJECTIVE: Fecal occult blood testing (FOBT) screening can reduce colorectal cancer (CRC) mortality when patients with an abnormal result [FOBT(+)] undergo a complete diagnostic evaluation (colonoscopy or double-contrast barium enema with or without flexible sigmoidoscopy). The aim of this study was to determine common reasons for nonperformance of a complete diagnostic evaluation. METHODS: We identified 544 FOBT(+) patients, aged 50 yr or older, who had participated in a managed care organization-sponsored CRC screening program. The performance of a complete diagnostic evaluation was determined from a patient-specific follow-up form and managed care organization claims data. Physicians were asked to report whether patients submitted to a complete diagnostic evaluation. When an evaluation was not done, the physicians were also asked to state the reasons for nonperformance. RESULTS: A total of 248 (46%) patients did not undergo a complete diagnostic evaluation. Physicians provided reasons for nonperformance for 50% (123/248). Factors accounting for nonperformance of a complete diagnostic evaluation were classified as follows: primary care physician decision (50%); specialist decision (28%); patient decision (17%); and other (practice-related) (5%). Many failures to complete an appropriate diagnostic evaluation were due to providers deciding to repeat the FOBT, perform a sigmoidoscopy, or not to proceed with any further testing. CONCLUSION: Many patients with a positive FOBT do not receive a complete diagnostic evaluation. The reasons for nonperformance most frequently have to do with physician decision making. Many physician-related explanations do not conform to expert recommendations for appropriate follow-up.

Project Label	Abstract
Core	*Partin MR, Slater JS.* *Promoting repeat mammography use: Insights from a systematic needs assessment.* *Health Education and Behavior 2003; 30 (1):97-112.* This article describes the process and outcome of a needs assessment conducted to guide the development of interventions to increase repeat mammography use among participants in a federally funded cancer screening program. Health behavior theory and data from a phone survey are used to uncover key barriers to repeat mammography use and to identify fruitful intervention approaches for modifying them. Estimates of (a) compliance with mammography guidelines, (b) readiness to adopt regular mammography use, (c) the most common reasons for not being rescreened, and (d) population attributable risks associated with various predictors of repeat mammography use are presented and, with guidance from the transtheoretical model of behavior change, used to make inferences about the type of intervention strategies most appropriate for promoting repeat mammography use in this population.
Core	Partin MR, Malone M, Winnett M, Slater J, Bar-Cohen A, Caplan L. The impact of survey non-response bias on conclusions drawn from a mammography intervention trial. Journal of Clinical Epidemiology 2003 Sep; 56(9):867-73. BACKGROUND AND OBJECTIVE: This study demonstrates the impact of survey nonresponse bias on conclusions from a mammography trial targeting a disadvantaged population. METHODS: The trial randomized 1558 women to three interventions designed to promote repeat mammography: mailed reminder (minimum group); mailed thank-you card, patient newsletters, and reminder (maximum group); and no mailings (control group). The primary outcome, repeat mammogram within 15 months, was assessed from administrative and phone survey data. RESULTS: Administrative estimates revealed a statistically significant difference of 7% between the maximum and control groups on the primary outcome. Survey estimates (response rate 80%) revealed no significant differences. The differences by data source were traced to a survey nonresponse bias. There was a statistically significant difference of 16% between the maximum and control groups among survey nonrespondents for the primary outcome, but there were no differences among survey respondents. CONCLUSION: The findings reiterate that even a low survey nonresponse rate can bias study conclusions and suggest studies targeting disadvantaged populations should avoid relying solely on survey data for outcome analyses.
Core	Wilt TJ, Partin MR. Prostate cancer intervention. Involving the patient in early detection and treatment. Postgraduate Medicine 2003 Oct; 114(4):43-49. Cancer screening by PSA testing is widespread in the United States, and treatment recommendations encourage early therapy. Yet controversy about patient care persists because evidence demonstrating that these approaches improve the length and quality of a man's life is lacking. Physicians can assist their patients by first providing a balanced presentation of the known risks and benefits of prostate cancer detection and treatment and then incorporating patient preferences into medical decisions. Success in shared decision making may increase with use of patient education materials to convey most of the time-consuming and challenging information. At least two of the many materials developed can be easily administered with very few resources and independent of primary care

Project Label	Abstract
	encounters.
Cost Utility	*Provenzale D.* *The cost-effectiveness of screening the average-risk population for colorectal cancer.* *Gastrointest Endo Clin NA 2002;12(1):93-109.* This article reviews several of the recent models addressing the cost-effectiveness of colorectal cancer screening in the average-risk individual (Table 1). How can clinicians and policy makers use this information for decision making regarding colorectal cancer screening? The cost-effectiveness ratios reported by themselves do not identify cost-effective practices. They must be placed in a decision context that is expressed in one of two forms. In the first form, an explicit threshold or maximum amount that a policy maker is willing to spend is stated (e.g., $40,000 per LY gained, as has been quoted as an acceptable amount for a prevention program). In the second form of decision context, a list of medical practices and their associated cost-effectiveness ratios, also known as a league table (Table 2) is used as a basis for comparison with the practice under evaluation (e.g., colorectal cancer screening). The practice with the lowest cost-effectiveness ratio is the most cost-effective practice on the list. Practices with lower cost-effectiveness ratios are considered cost-effective compared with those with higher ratios. Table 2 lists incremental cost-effectiveness ratios for common medical practices. The models discussed in this article suggested that colorectal cancer screening using annual FOBT, flexible sigmoidoscopy at 3 or 5 years, the combination of FOBT and flexible sigmoidoscopy, barium enema, colonoscopy, and even virtual colonoscopy had incremental cost-effectiveness ratios ranging from $6300 to $92,900 per LY saved with most of the cost-effectiveness ratio ranging from $10,000 to $40,000 per LY saved. These ratios are similar to the cost of another widely accepted practice, breast cancer screening with annual mammography in women age 50 and older ($22,000 per LY gained). Colorectal cancer screening with any of the modalities discussed is considered less cost-effective than screening for hemochromatosis, which has an incremental cost-effectiveness ratio of $3665 per LY saved. Based on these ratios, however, screening for colorectal cancer is considered cost-effective compared with cervical cancer screening in women age 20 and older with pap smear every 3 years, which has an incremental cost-effectiveness ratio of $250,000 per LY gained. The clinician can use these incremental cost-effectiveness ratios to evaluate the risks and benefits of alternative practices for the individual, and the policy maker with a limited health care budget can use these ratios to set priorities for funding based on the costs and the expected gains in life expectancy for colorectal cancer screening and for alternative health care programs.
Cost Utility	*Provenzale D.* *Aspirin as an adjunct to colorectal cancer screening: is it cost-effective?* *Evidence-Based Gastroenterology 2002;(2):57-58.* Abstract not available.
Core	*Provenzale D, Gray RN, Fisher D, Schmidt T.* *Patient-Centered Outcomes in Colorectal Cancer Screening.* *Evidence-Based Gastroenterology 2002;3:12-25.* Abstract not available.

Project Label	Abstract
Core	Provenzale D, Ofman J, Gralnek I, Rabeneck L, Koff R, McCrory D. Gastroenterologist specialist care provided by generalists - an evaluation of effectiveness and efficiency. Am J Gastroenterol 2003;98(1):21-28. OBJECTIVE: In this era of cost containment, gastroenterologists must demonstrate that they provide effective and efficient care. The aim of this study was to evaluate the process and outcomes of care provided by gastroenterologists and generalist physicians (internists, family physicians, general surgeons) for GI conditions. METHODS: We conducted a systematic literature review using a MEDLINE search of English language articles (January 1980 to September 1998). A total of 2157 articles were identified; 10 met inclusion criteria for systematic review. In addition, there were nine articles that described the results of physician surveys, and examined the process of care among gastroenterologists and generalist physicians. RESULTS: Care provided by gastroenterologists for GI bleeding and diverticulitis resulted in significantly shorter length of hospital stay. Gastroenterologists diagnosed celiac disease more accurately than generalists, and more adequately diagnosed colorectal cancer and prescribed antimicrobials for peptic ulcer disease. There was no difference between gastroenterologists and generalists in terms of colonoscopy procedure time, and family physicians detected a greater number of cancers. Furthermore, there was no difference in the outcomes of gastroesophageal reflux disease therapy in patients seen by gastroenterologists, versus those educated by nurses. The survey articles suggested that gastroenterologists were more likely to test and treat for Helicobacter pylori in patients with peptic ulcer disease, and were more likely recommended for medical versus surgical therapy. Gastroenterologists had a lower threshold for ordering ERCP before cholecystectomy than surgeons, but had similar responses regarding indications for surgery in inflammatory bowel disease. Finally, primary care physicians were less likely to associate symptoms of profuse watery diarrhea with cryptosporidium infection compared with gastroenterologists and infectious disease specialists. CONCLUSIONS: We reached the following conclusions: 1) The results suggest that gastroenterologists deliver effective and efficient care for GI bleeding and diverticulitis and provide more effective diagnosis in certain disorders. 2) Studies are limited by retrospective design, small sample size, and lack of control groups. 3) To fully evaluate care by gastroenterologists, prospective comparisons with greater attention to methodology are needed.
Screen GI	Provenzale D. Screening and Surveillance of Gastrointestinal Cancers. In: Rustgi AK, Crawford JM (eds) Gastrointestinal Cancers A Companion to Sleisenger and Fordtran's Gastrointestinal and Liver Disease. Philadelphia:Saunders, 2003. Abstract or book summary not available.
UM Cancer Center	Levin B, Smith RA, Feldman GE, Colditz GA, Fletcher RH, Nadel M, Rothenberger DA, Schroy III PS, Vernon SW, Wender R. Promoting early detection tests for colorectal carcinoma and adenomatous polyps. A framework for action: The strategic plan of the National Colorectal Cancer Roundtable. Cancer 2002;95:1618-1628. BACKGROUND: The purpose of the current study was to provide health professionals, professional organizations, policy makers, and the general public with a practical blueprint for increasing the practice of screening for colorectal carcinoma (CRC) and adenomatous polyps over the next decade. The National Colorectal Cancer Roundtable (NCCRT) was founded in 1997 by the American Cancer Society and the Centers for Disease Control and Prevention to provide strategic leadership, advocacy, long-range planning, and

Project Label	Abstract
	coordination of interventions targeted at reducing the disease burden of CRC through education, early detection, and prevention. The NCCRT and its three workgroups include CRC survivors; recognized experts in primary care, gastroenterology, radiology, colorectal surgery, nursing, public policy, epidemiology, and behavioral science; patient advocates; and representatives of health plans and insurers, government, and other organizations. METHODS: The NCCRT performed a literature review of published and unpublished data related to CRC screening guidelines, compliance, and barriers to adherence, as well as test effectiveness and cost-effectiveness. Members of the three NCCRT workgroups developed summary reports regarding professional education, public education and awareness, and health policy. A drafting committee developed the final strategic plan from workgroup reports, which was reviewed by the entire NCCRT membership, amended, and subsequently approved in final form. RESULTS AND CONCLUSIONS: Although the rationale for population-wide CRC screening is well established, the majority of adults in the U.S. are not currently being screened for CRC. Thus, the nation foregoes an opportunity to reduce CRC-related mortality by an estimated >or= 50%. To increase CRC screening rates, the issues of patient and physician barriers to screening, lack of universal coverage, lack of incentives to motivate adherence, and expanded infrastructure must be addressed. Copyright 2002 American Cancer Society.
UM Cancer Center	*Rothenberger DA, Garcia-Aguilar J. Management of cancer in a polyp. In: Saltz L, ed. Colorectal cancer: multimodality management. New Jersey: Humana Press, 2002:325-335.* Book summary: Leonard Saltz, MD, has brought together a team of leading clinical, surgical, and radiation oncologists, as well as those specialists involved in pain management, diagnostic imaging, and complementary medicine, to create a unified vision of the many new possibilities for managing colorectal cancer. Here the practicing clinician will find cutting-edge reviews on advances in diagnostic and therapeutic radiology and the surgical aspects of treating colorectal cancer, the major therapeutic agents, the currently available drugs for first and second line management of metastatic colorectal cancer, chemotherapy for adjuvant management, and local regional therapies. Additional reviews explain the molecular genetic events that occur in colorectal cancer, the new understanding of dietary and environmental factors, possible strategies for prevention, pain control, and complementary and alternative medicine approaches. Colorectal Cancer: Multimodality Management provides an authoritative evidence-based review of the best currently available approaches to the prevention, diagnosis, and treatment of colorectal cancer.
UM Cancer Center	Michelassi F, Bleday R, Brown G, Rothenberger DA, Vernava AM III, Willett C, Wong WD. The multidisciplinary treatment of rectal cancer. [Symposium] Contemp Surg 2003;59:12-21. Surgeons are challenged in their efforts to provide the best treatment for patients with rectal cancer. In this symposium, our panelists discuss goals of treatment and controversies in the care of rectal patients with cancer.
UM Cancer Center	Garcia-Aguilar J, Sirivongs P, Lee S, Madoff RD, Rothenberger DA. A pathologic complete response to preoperative chemoradiation is associated with lower local recurrence and improved survival in rectal cancer patients treated by mesorectal excision. Dis Colon Rectum 2003;46:298-304.

Project Label	Abstract
	PURPOSE: Preoperative chemoradiation reduces tumor size and nodal metastasis in patients with rectal cancer. Tumor downstaging has been associated with an increased probability of a sphincter-saving procedure and with improved local control. However, pathologic complete response to chemoradiation has not been correlated with local control and patient survival. We studied the prognostic value of pathologic complete response to preoperative chemoradiation in rectal cancer patients. METHODS: We have prospectively followed up 168 consecutive patients with ultrasound Stages II (46) and III (122) rectal cancer treated by preoperative chemoradiation followed by radical resection with mesorectal excision; 161 had a curative resection. Recurrence and survival were compared with tumor characteristics and pathologic complete response. Average follow-up was 37 months. RESULTS: Tumor downstaging occurred in 97 (58 percent) patients, including 21 (13 percent) patients who had a pathologic complete response. None of the clinical or pathologic variables was associated with pathologic complete response. The estimated 5-year rate of local recurrence was 5 percent; of distant metastasis, 14 percent. None of the patients with pathologic complete response has developed disease recurrence. We found no difference in survival among patients with pathologic Stages I, II, or III tumors. CONCLUSIONS: A pathologic complete response to preoperative chemoradiation is associated with improved local control and patient survival. For patients without pathologic complete response, the pathology stage does not have prognostic significance.
UM Cancer Center	Dykes SL, Qui H, Rothenberger DA, Garcia-Aguilar J. Evidence of a preferred molecular pathway within patients with synchronous colorectal cancer. Cancer 2003;98:48-54. BACKGROUND: A small proportion of patients with colorectal carcinoma (CRC) have synchronous tumors at the time of diagnosis. A subset of sporadic CRCs display microsatellite instability (MSI) that is associated with MLH1 silencing due to promoter methylation. In the current study, the authors investigated the proportion of tumors with MSI in patients with synchronous colorectal carcinoma (SCRC) and the concordance in MSI status among tumors in a given individual. In addition, the authors examined MLH1 and MSH2 expression and MLH1 promoter methylation in SCRCs. METHODS: The current study included 77 patients, with a combined total of 170 invasive SCRCs, who were identified from a database of 2884 patients with CRC. Instability was determined by polymerase chain reaction (PCR) amplification using a set of five markers. Tumors that were unstable at two or more markers were considered unstable (MSI); otherwise, they were considered microsatellite stable (MSS). Expression of MLH1 and MSH2 was determined by immunohistochemistry. Methylation of the MLH1 gene promoter was determined by a methylation-specific PCR assay. Statistical comparisons were made using the chi-square test or the Student t test. RESULTS: Of the 77 patients in the study, 21 (27%) had a family history of hereditary nonpolyposis colon carcinoma-related malignancy, but none fulfilled the Amsterdam II criteria. Fifty-four of 170 tumors (32%) were found to be MSI. Patients with MSI tumors were older and more frequently female. All but 1 MSI tumor lacked expression of MLH1 (n = 44) or MSH2 (n = 8), or both (n = 1). All MLH1-negative tumors, compared with only 3 MLH1-positive tumors, were methylated at the MLH1 promoter. Most patients (n = 67; 87%) had either all MSS tumors (n = 48; 62%) or all MSI tumors (n = 19; 25%); 10 patients (13%) had both MSS and MSI tumors. The observed MSI/MSS distribution was significantly different from the distribution expected based on an assumption of independence (P < 0.0001). CONCLUSIONS: There is a strong concordance in MSI/MSS status among tumors in the same individual. This finding suggests that the tumors in patients with SCRC develop along a preferred molecular pathway.
Core	*van Ryn, M.*

Project Label	Abstract
	Research on the Provider Contribution to Race/ethnicity Disparities in Medical Care. *Medical Care 2002, 40(1):I140-I151.* Objective. Little is known about why black patients and other ethnic/racial minorities are less likely to receive the best treatments independent of clinical appropriateness, payer, and treatment site. Although both provider and patient behavior have been suggested as possible explanatory factors, the potential role of provider behavior has remained largely unexplored. Does provider behavior contribute to systematic inequities? If so, why? The purpose of this paper is to build on existing evidence to provide an integrated, coherent, and sound approach to future research on the provider contribution to race/ethnicity disparities in medical care. First, the existing evidence suggestive of a provider contribution to race/ethnicity variance in medical care is discussed. Second, a proposed causal model, based on a review of the social cognition and provider behavior literature, representing an integrated set of hypothesized mechanisms through which physician behavior may contribute to race/ethnicity disparities in care is presented. Conclusion. There is sufficient evidence for the hypothesis that provider behavior contributes to race/ethnicity disparities in care to warrant further study. Although there is some evidence of support of the hypotheses that both provider beliefs about of patients and provider behavior during encounters are independently influenced by patient race/ethnicity further systematic rigorous study is needed and is proposed as a major immediate research priority. These mechanisms deserve intensive research focus as they may prove to be the most promising targets for interventions intended to ameliorate the provider contribution to disparities in care.
Core	van Ryn, M. and Fu, S. Paved With Good Intentions: Do Public Health and Human Service Providers Contribute to Race/Ethnicity Disparities in Health? American Journal of Public Health, 93(2) There is extensive evidence of racial/ethnic disparities in receipt of health care. The potential contribution of provider behavior to such disparities has remained largely unexplored. Do health and human service providers behave in ways that contribute to systematic inequities in care and outcomes? If so, why does this occur? The authors build on existing evidence to provide an integrated, coherent, and sound approach to research on providers' contributions to racial/ethnic disparities. They review the evidence regarding provider contributions to disparities in outcomes and describe a causal model representing an integrated set of hypothesized mechanisms through which health care providers' behaviors may contribute to these disparities.
Core	*Anderson WF, Guyton KZ, Hawk ET, Levin B, Vernon SW, Hiatt R.* *Colorectal cancer screening for persons at average risk.* *Journal of the National Cancer Institute, 94:1126-1133, 2002.* In the United States, colorectal carcinoma (CRC) is the fourth most frequently diagnosed and the second most common cause of cancer-specific death for both men and women (1). The lifetime risk of developing CRC is approximately 6% (2), and treatment costs nearly $6 billion annually (3). As for most epithelial cancers, CRC age-specific incidence increases continuously with biologic aging, with the greatest risk occurring in those individuals aged 80 years or older (2) (Fig. 1). Of the more than 148 000 estimated new CRC cases in the year 2002 (4), approximately 40% are expected to die within 5 years (2). Death from CRC is especially unfortunate, given

Project Label	Abstract
	that CRC prevention often can be achieved through screening (5). CRC screening affords the opportunity to identify and remove precursor lesions (e.g., preinvasive adenomatous polyps or adenomas) (6). Indeed, direct, longitudinal observation of, and intervention in, the long-term, multi-step process of colorectal carcinogenesis-partially represented by the adenomato-carcinoma sequence in Fig. 2 (7,8)-can be achieved with existing endoscopic technologies (6,9, 10). Although efficacy has been demonstrated in this regard, only 44% of U.S. adults aged 50 years or older have recently had any type of CRC screening. To address these and other concerns, the National Cancer Institute (NCI) convened a workshop in March 2001 to review 1) routine and emerging CRC screening technologies; 2) valid endpoints (or targets) for CRC screening, particularly with regard to comparative evaluations of new and existing technologies; and 3) barriers to screening. This document with commentary from the authors summarizes the NCI workshop proceedings. Appendices A and B provide a complete listing of speakers and attendees.
Core	Klabunde CN, Frame PS, Meadow A, Jones E, Nadel M, Vernon SW. A national survey of primary care physicians' colorectal cancer screening recommendations and practices. Prev Med, 36:352-362, 2003. BACKGROUND: National data on providers' colorectal cancer (CRC) screening knowledge, attitudes, and practices are sparse. This study assessed primary care physicians' (PCPs') beliefs about the effectiveness of CRC screening, their recommendations for screening, their perceptions of the influence of published guidelines on their CRC screening recommendations, and how they conduct CRC screening in their clinical practices. METHODS: A questionnaire was administered to a nationally representative sample of practicing PCPs. Of 1718 eligible physicians, 1235 (72%) responded. RESULTS: Only 2% of PCPs said they did not recommend CRC screening. Over 80% indicated that they most often recommend CRC screening with fecal occult blood testing and/or flexible sigmoidoscopy, although colonoscopy was perceived as the more effective screening modality. Nearly two-thirds of obstetrician/gynecologists and one-fourth of other practitioners reported conducting fecal occult blood testing exclusively by digital rectal exam. Only 29% of PCPs said they perform sigmoidoscopy. Estimated volumes of ordering, performing, or referring for CRC screening were low, and <20% reported that three-fourths or more of their older patients were up to date with CRC screening as recommended by the physician. Many PCPs reported recommending CRC screening at nonstandard starting ages or too-frequent intervals. CONCLUSIONS: Awareness of CRC screening among PCPs in the United States is high. However, knowledge gaps about the timing and frequency of screening and suboptimal screening delivery were evident.
Core	Cokkinides VE, Chao A, Smith RA, Vernon SW, Thun MJ. Correlates of underutilization of colorectal cancer screening among U.S. adults, age 50 years and older. Prev Med, 36:85-91, 2003. BACKGROUND: Although effective screening for colorectal cancer (CRC) exists, only 37% of incident CRC are diagnosed at a localized stage at which treatment is effective. We identified demographic and other characteristics of adults (> or = 50 years old) who reported no CRC screening. METHODS: We calculated the prevalence of never having had a fecal occult blood test and/or a

Project Label	Abstract
	sigmoidoscopy or colonoscopy by age, sex, and other factors using the 1999 Behavioral Risk Factor Surveillance System data. RESULTS: CRC screening tests were underutilized across all segments of the population. Underutilization was highest in persons aged 50-64 years and those with lower education and a lack of health insurance and preventive services. CONCLUSIONS: The data indicate that large proportions of average-risk adults across various sociodemographics and behavioral factors are not utilizing recommended CRC screening tests. There is a need to increase the awareness of the importance of utilizing effective CRC screening tests for the early detection of colorectal cancers.
Core	Watts BG, Vernon SW, Myers RE, Tilley BC. Intention to be screened across time in male automotive workers. Cancer Epidemiology, Biomarkers & Prevention, 12:339-349, 2003. Intention is an important construct in health promotion research, yet very little is known about whether cross-sectional correlates of intention to be screened for colorectal cancer (CRC) also predict intention over time or intention change. We used survey data from The Next Step Trial, a worksite health promotion trial, to address the following questions: (1) What is the consistency over time of intention to be screened for CRC? (2) Are the patterns and magnitude of associations between intention to be screened and the Preventive Health Model variables consistent over time? (3) What are the predictors of improving weaker intention to be screened, i.e., changing to strong intention? (4) What are the predictors of no change in strong intention to be screened, i.e., maintaining strong intention? and (5) What is the predictive ability of the models to predict intention to be screened for CRC? The study population consisted of white male automotive employees who responded to baseline (1993) and follow-up (1994 and 1995) surveys and did not have CRC at baseline or develop it during the study period. Of 5042 eligible workers, 2903 (58%) returned a baseline survey, and 2556 (88% of survey responders) met eligibility criteria; 75% (1929 of 2556) returned the year 1 survey, and 74% (1892 of 2556) returned the year 2 survey. We fit logistic regression models separately for the Preventive Health Model variables measured at baseline and each outcome (intention at year 1, intention at year 2, improving weaker intention, and no change in strong intention). The prevalence of strong intention to be screened for CRC was approximately 60% on all three surveys. Overall, 66% maintained their baseline intention over time. The most consistent predictors of strong intention, improving weaker intention, and no change in strong intention were family support, belief in the salience and coherence of screening, prior screening, and lack of concern about screening-related discomfort. Intention measured at baseline predicted intention measured 1 and 2 years later. Perceived susceptibility and lack of fear and worry about a CRC diagnosis predicted improving weaker intention. Having a family history of CRC or polyps predicted maintaining strong intention. Plant factors, self-efficacy, and beliefs about polyp removal were not predictors beyond the baseline year. Basing intervention development on cross-sectional associations may miss important factors or may incorrectly assume that cross-sectional associations are stable over time. A more focused, tailored intervention may be developed using factors that consistently predict intention.

Appendix C. Project Abstracts, Active and Completed Projects

Project Label	Abstract
DSC Study	Provider Interview Study: Focus on Acceptability of Direct Screening Colonoscopy and Identification of Methods to Increase Endoscopic Appointment Completion Rates Burgess, Diana & Kochevar, Laura CCDOR (HSR&D LIP) OBJECTIVES: (1) To gain a greater understanding of providers' perceptions and benefits of, barriers to, and key issues in moving to direct screening colonoscopy (DSC) at the Minneapolis VAMC to inform decision-making regarding the value of implementing a DSC intervention. (2) To gather data necessary to design multifaceted, cost-effective strategies for increasing endoscopic appointment completion rates. These data and resulting intervention designs will allow us to develop a proposal for funding to test intervention effectiveness. RESEARCH DESIGN/METHODOLOGY: Forty-nine providers will be recruited from the list of primary care providers (physicians, nurse practitioners, physician assistants, RN's) in General Internal Medicine and GI at the Minneapolis VAMC. Providers will be sent a letter in which they will be invited to participate in an interview sponsored by CCDOR, to get their perspective on issues involving colorectal cancer screening and endoscopic procedures. Following this letter, they will be contacted directly by phone or in person to obtain informed consent and schedule a time for a 30-minute interview. An experienced interviewer will conduct semi-structured interviews (which will be tape-recorded), using an interview guide developed by the project investigators and pilot tested on VAMC providers. Providers will be asked to identify benefits, barriers and key issues in moving to direct screening colonoscopy (DSC) at the Minneapolis VAMC. In addition to exploring interviewees' perceptions, beliefs and attitudes, the interviewer will seek input on capacity and system issues that would facilitate or inhibit the transition to DSC. Providers will also be asked about how they identify patients at high risk for failing to successfully complete their endoscopic appointment and what their recommendations are for effective intervention strategies to increase endoscopic appointment completion rates. The ability to integrate intervention strategies into existing clinic workflow will be probed. At the end of the interviews, respondents will be asked if they would be interested in a follow-up interview in which they would assess constructed case descriptions and estimate the risk of failure to complete an endoscopic appointment. If the participant expresses interest, a follow-up interview will be scheduled. The participant will be re-consented at the follow-up interview. The cases will be constructed to reflect factors that the participant cited as indicative of increased risk of failure to complete an endoscopic appointment. The participants' assessment of the constructed cases will be used to validate the responses given at the initial interview. CLINICAL SIGNIFICANCE: (1) The Minneapolis GI service and CRC QUERI is considering proposing a direct screening colonoscopy trial. The proposed study will enable providers to contribute valuable feedback on support required and issues related to the DSC trial and will give providers a voice in the process, which is expected to increase the acceptability of this study, if it were to occur. The proposed project represents a rapid, utilization focused needs-assessment necessary for the colorectal cancer QUERI to capitalize on an opportunity for subsequent research testing the acceptability, screening penetration, adverse events, reduction in late-stage cancer detection, and efficiency of direct screening colonoscopy. (2) Canceled endoscopy appointments add to both the cost and wait times for endoscopies. The GI endoscopy clinic reports a sub-optimal 54% appointment completion rate. A move to DSC will require that we recoup the endoscopic capacity currently lost to clinic no-shows and cancellations. Experienced providers can provide invaluable insights into identifying at risk patients and providing support they may need to successfully complete the endoscopic procedure.

Project Label	Abstract
CRC in Elderly	CA89544 Colorectal Cancer Care Variation in Vulnerable Elderly Dominitz, Jason NCI Using data from the 1991-1998 linked Medicare claims and Surveillance, Epidemiology, and End Result (SEER) Program data, this study will determine the extent to which initial colon cancer treatment and continuing cancer care of the elderly living in rural areas of varying size and remoteness diverges that of the elderly living in urban areas, then will measure the impact of variation in continuing colon cancer care on survival. Because of differences in management of colon cancer at different stages, initial treatment and continuing care will be examined separately by cancer stage.
Tumor Registry	Tumor Registry Dominitz, Jason ERIC The aim of this study is to determine the extent to which VA Central Cancer Registry (CCR) information agrees with medical record review and with clinical information abstracted from administrative databases for patients treated within VISN 20. Specific items to validate include the diagnosis of colorectal cancer and tumor stage at diagnosis. The study will be a retrospective review of existing data. Calendar years 1999 through 2003 will comprise the study period. Study Populations:*Two study populations will be compiled:* Veterans listed in the VA CCR as having been diagnosed with colorectal cancer at a VISN 20 facility during the study period and Veterans listed in the VISN 20 data warehouse (CHIPS) with a diagnosis of colorectal cancer or with SNOMED codes indicating a colorectal neoplasm during the study period. Prevelant cases will be excluded. In addition to VA CCR and CHIPS data, anatomic pathology reports, discharge summaries and other notes will be extracted from VistA for veterans in either of the above populations. Data analysis will include comparisons of diagnosis and staging information available from each of the three data sources. The presence of Tumor Board or Oncology notes can be determined through CHIPS. Anatomic pathology reports will be held as the gold standard for this report when determining the presence of a malignancy. The kappa statistic will be used to assess pair-wise agreement in the diagnosis of an incident cancer **among the** three databases. Although staging information is more difficult to determine, Tumor Board, Oncology, Radiation therapy notes and discharge summaries will be reviewed to determine this information. If stage cannot be identified specifically from a note or discharge summary, a clinician will review the medical record, blinded to the Tumor Registry stage. The kappa statistic will be used to assess pair-wise agreement in cancer stage between the registry and the chart review. Additional analyses will be performed to determine if agreement varies across facility types or according to patient characteristics (e.g. service connection, regular VA users, Medicare eligible age). Case details that will be abstracted include demographics (e.g. age, gender, race, service connection, zip code), health care utilization (e.g. number of VA visits in the past year), medical facility, clinical information (e.g. tumor location, stage, presence of distant metastases) and treatments administered (e.g. chemotherapy, radiation therapy, surgery). Agreement among the data sources will be determined for those

Project Label	Abstract
	data elements appearing in more than one data source. To compare characteristics according to source of information, the chi-square statistic will be used for categorical variables and one-way analysis of variance for continuous variables such as age.
CP/CRC Prevention	Multi-Agent Prevention of Colon Polyps and Colorectal Cancer Dominitz, Jason University of Michigan Comprehensive Cancer Center This study hypothesizes that combinations of non-steroidal anti-inflammatory drugs (NSAIDs), cholesterol-reducing statins, and glucose-sensitizing glitazones are additive in their ability to reduce the formation of colon polyps, the incidence of colon cancer, and mortality from colon cancer. We will use data collected on a cohort of Veterans receiving care from the General Internal Medicine Clinics at 7 VA medical centers throughout the United States (The Ambulatory Care Quality Improvement Project, ACQUIP) to perform a case-control study. The findings from the proposed research, if appropriate, will be used as preliminary evidence for additional research funding to evaluate this hypothesis in similar databases. We are specifically considering the use of the VA National Pharmacy Database and the Group Health Cooperative Database. Our specific aims include: 1) To evaluate whether glitazones, statins or NSAIDS, either alone or in combination, are associated with reductions in: (a) the detection of colon polyps, (b) colorectal cancer incidence, and (c) colorectal cancer mortality. 2) To evaluate if dose or duration of exposure to glitazones, statins or NSAIDS are associated with reductions in: (a) the detection of colon polyps, (b) colorectal cancer incidence, and (c) colorectal cancer mortality.
CRC Knowledge & Attitudes	RCD 01-005 Colorectal Cancer Screening Knowledge and Attitudes: Impact of Intervention Ferreira, M. Rosario VA HSR&D Research Career Development Award The proposed research project is aimed at improving veteran and non-veteran health care. Cancer of the colon and rectum is the third most common cancer and the third most common cause of cancer-related deaths in the U.S. Although CRC screening has been shown to reduce CRC-related mortality, less than half of the U.S. population has been screened. Screening rates are even lower among individuals of lower socio-economic status and lower educational levels. At VA Chicago, Lakeside Division approximately 25% of veterans received CRC screening. My proposed research evaluates baseline knowledge, attitudes and beliefs regarding CRC screening among veterans, assesses changes in knowledge, attitudes and beliefs after a low literacy educational intervention, and addresses barriers and motivators to CRC screening, in the context of a funded RCT. The results of my study will provide information regarding the processes of providing CRC screening information and addressing perceived barriers among veterans. My study will help identify the components of the decision-making process (such as susceptibility to CRC and benefits of screening) that are affected by the educational intervention, and how these may shape an individual's decision to be screened. These results may help in developing future and more effective educational interventions. Successful

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	educational interventions would increase the use of CRC screening tests, ultimately leading to a decrease in CRC-related mortality.
CRC & Health Belief	RO1 CA86424-01A2 Health Belief Model-Directed Intervention For Colorectal Cancer Screening Ferreira, M. Rosario (Co-investigator) (Bennett, Charles – PI) NIH The primary objective of this study is to assess patient factors that affect access to and compliance with colorectal screening procedures in a defined primary care setting and to develop intervention measures to assure that all patients are making informed decisions regarding this important process. The project will evaluate the effectiveness of two intervention programs, specifically designed for low literacy patients, in general medicine clinics in one Veterans Affairs Medical Center. The first program targets primary care providers and second targets patients (mindful of the range of literacy levels in this setting) and compares each of these to current educational standard.
CRC Health Literacy & Race	IIR 02-010 The Impact of Health Literacy on Racial Differences in Cancer Stage at Presentation Ferreira, M. Rosario (Co-investigator); (Arozullah, Ahsan – PI) VA HSR&D OBJECTIVES: Eliminating racial disparities in health outcomes have become a national priority. Previous studies found that African American males have higher mortality rates for prostate, colorectal, and lung cancer compared to whites. These three cancers are also the leading causes of cancer mortality for men in the United States. However, it is not clear how racial differences in health literacy, screening test utilization, and/or delays in obtaining care contribute to racial differences in advanced stage presentation. The purpose of this study is to determine if racial differences in the rate of advanced stage presentation for prostate, colorectal, and lung cancer can be explained by differences in health literacy, use of screening tests, or both. METHODS: We plan to conduct a cross-sectional survey and health literacy assessment for African-American and white patients with newly diagnosed prostate, colorectal, and lung cancer. Study participants will be recruited from the outpatient oncology, gastroenterology, and urology clinics at VA Chicago Healthcare System (Westside and Lakeside Divisions) and the Hines VA hospital. Individuals with the following conditions will be excluded: (1) dementia; (2) blindness or having severely impaired vision not correctable with eyeglasses; (3) deafness or having hearing problems uncorrectable with hearing aid; and (4) being too ill to participate in the survey. The study sample will include 300 patients with each cancer type (prostate, colorectal, and lung). Based on the patient population at the participating hospitals, we anticipate that 50% of the participants will be African-American and the other 50% will be white. Information about subjects will be obtained through personal surveys and medical record reviews. Each subject will be interviewed to assess health literacy and obtain information about age, race, physical and mental health status, employment and education history, health risk behavior, prior cancer screening, health service access and utilization, trust, satisfaction, and income. During the interview, patients will be asked about prior colorectal and prostate cancer screening tests. Cancer stage information will be obtained by reviewing medical records and pathology reports. The shortened Rapid Estimate of Adult Literacy in Medicine (REALM) will be used to assess health literacy. The

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	shortened REALM consists of a list of 66 common medical terms that participants are asked to read aloud. ANALYSIS PLAN: Logistic regression modeling will be used to estimate the relationship between race and advanced stage of prostate, colorectal, or lung cancer at presentation (stages A-C versus stage D), while controlling for differences in age, health literacy level, education, socioeconomic status, social support, health status, and site of care. The dependent variable will be stage D disease at presentation (yes/no). Interaction terms between race and method of cancer diagnosis will also be evaluated. Separate analyses will be performed to assess the impact of trust, satisfaction, screening test utilization, healthcare utilization, and screening test knowledge on the relationship between race and advanced stage at presentation. ANTICIPATED IMPACT: The results of this study will improve our understanding of the underlying factors associated with racial disparities in stage at presentation for the three most common cancers in the VA healthcare system. This information will greatly enhance our ability to design targeted and effective future interventions, specifically, whether future interventions should focus on improving screening test utilization or improving the understanding of early symptoms for low literacy patients.
ACG GI	XNV 21-063 Patient-Centered Outcomes GI Screening/Surveillance Fisher, Deborah ACG Jr. Faculty Development Award “Gastrointestinal Cancer Surveillance: Patient-Centered Outcomes” includes three related studies. “Health Seeking Behavior” examines predictors of colorectal cancer screening participation in veterans and non-veterans. “Survival in Colorectal Cancer: Benefit of Follow-up Colonoscopy” compares the 5-year survival of patients with colorectal cancer who receive at least one colonoscopy after diagnosis to patients who have no further procedures. “Quality of Life for Patients with Barrett’s Esophagus Undergoing Surveillance” has several objectives 1) to develop an instrument to measure HRQL (health-related quality of life) by utility assessment in patients with Barrett’s esophagus undergoing surveillance 2) to determine the components of the decrement in HRQL for BE surveillance 3) to determine if discrete health states are predictive of the holistic scenario. The colorectal cancer projects use multivariable analysis of administrative databases and survey data set with validation by medical record review. The Barrett’s esophagus project is a prospective observational study. The definitive goal of cancer screening and surveillance is to reduce cancer deaths. Each of these projects examines outcomes that impact the effectiveness of gastrointestinal cancer screening and surveillance programs. These outcomes include mortality and patient specific preferences for surveillance, as well as factors associated with participation in screening/surveillance programs.
Race & CDE	XNV 21-063 Race and Screening Follow-Up Fisher, Deborah ACG Clinical Research Award BACKGROUND: Screening for colorectal cancer (CRC) is recommended because it reduces cancer deaths. While the mortality for white patients with CRC has improved, the mortality for black patients has remained constant. Racial differences in CRC

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	screening, specifically the evaluation of a positive screening test, could contribute to the excess mortality. The overall compliance with appropriate evaluation of positive screening fecal occult blood tests (FOBT) is unknown in the VA (Veteran Affairs) system but has been inadequate in non-VA studies. OBJECTIVES: The primary aim of this pilot study is to determine if there are racial differences in the proportion of veterans who receive appropriate evaluation for a positive screening FOBT. The secondary aim is to identify barriers to CRC screening including provider non-adherence to guidelines, system barriers such as excessive waiting time for diagnostic studies and patient noncompliance with recommended tests. The long-term objective of this proposal is to use these pilot data to design targeted interventional trials to reduce barriers to CRC screening. METHODS: Medical records of consecutive patients with a positive screening FOBT in the year 2000 will be abstracted. Race, age, follow-up tests ordered and performed, time intervals to ordering and performing studies and patient noncompliance with scheduled procedures will be collected. The primary outcome will be whether or not an appropriate evaluation of the positive FOBT was performed within 12 months. Appropriate evaluation is defined as a colonoscopy or double contrast barium enema (DCBE), either alone or with a flexible sigmoidoscopy. If an adenoma was found on flexible sigmoidoscopy or a polyp was noted on a DCBE, the appropriate evaluation is a colonoscopy. For the primary outcome the initial analyses will be to estimate and compare the unadjusted adequate follow-up rates between white and black patients. A binomial proportion comparison of two independent samples will be conducted. An adjusted analysis, using logistic regression models, will be used to compare rates of adequate evaluation of a positive FOBT between blacks and whites after adjusting for patient compliance, clinic delay time, time to ordering further evaluation and time to completion of further evaluation.
VALUE Study	CRI 03-153 Determining the Prevalence of Health Literacy Among Veterans PI: Griffin, Joan HSR&D BACKGROUND: Studies estimate that nearly 45% of the U.S. population has difficulty with the basic reading, writing, and computing skills needed to function adequately in society. In this study we will health literacy, or literacy skills relevant to health and health care, in veterans at four VA medical centers. We then will evaluate whether poor health literacy skills are a barrier to colorectal cancer (CRC) screening. CRC is one of the leading causes of cancer deaths and is the third most common cancer diagnosed. Randomized clinical trials and systematic reviews demonstrate that early detection and diagnosis reduces morbidity and mortality, but CRC screening is complex. Multiple screening options are acceptable, yet all options vary by pre-screening preparation, invasiveness, sedation, and discomfort. The amount of information necessary to understand screening options and outcomes and the level of complexity needed to prepare and undergo screening may inhibit many from being screened, but especially those unable to read and synthesize informational materials or instructions adequately. MAJOR OBJECTIVES: The primary objectives for this study are to develop an estimate of the prevalence of health literacy at four geographically diverse VAMCs (Minneapolis, Portland, Durham, and West LA), and for specific groups based on age, race, education, and geographic location. Our secondary objectives are to illustrate the potential significance of poor health literacy by linking estimates for those over 50 years old to CRC screening data, examine variation in guideline concordant screening rates by health literacy levels, and identify the mechanisms that may mediate or moderate the effect of health literacy on screening. Principal data sources: Patients who are eligible and willing to participate will complete a face-to-face survey that will include demographic data, functional status, measures of attitudes and beliefs about screening, and the Short-Test of Functional Health Literacy in Adults

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	(S-TOFHLA). Survey data will then be matched to data from the CRC QUERI screening assessment and surveillance data system (CRS 02-162-1) to evaluate screening compliance. RESEARCH DESIGN: The study design is observational. Veterans with upcoming appointments in primary care clinics at each of the study sites will be randomly chosen and recruited. Principal type of analysis: Prevalence estimates and outcomes assessment. Study population: Veterans who use VHA primary care services at study sites and have an upcoming appointment. Expected contribution: Identifying the extent of poor functional health literacy among veterans and developing strategies to improve communication efforts directed towards vulnerable veterans addresses VHA's commitment to eliminating health disparities and promoting patient-centered care. Because health information is often readily modifiable this study will also lay the groundwork for a number of potential translation projects that could help reduce the deleterious effects of poor health literacy. Findings from this study are expected to have a number of broad implications for research (e.g., improving informed consent procedures) and practice within the VHA (e.g., improving patient education, better discharge summaries and prescription instructions). The results will identify areas where interventions or system-level changes could be most effective and provide a baseline for which the effect of future interventions could be compared.
CRC SDP	CRT 02-059 Translation of CRC Screening Guidelines to Practice - An Intervention Helfand, Mark NCI The long-term objective of this project is to reduce colorectal cancer (CRC) morbidity and mortality by improving adherence to best practice early detection procedures. The immediate objective is to implement and evaluate a system change intervention designed to facilitate complete diagnostic evaluation (CDE) of patients with positive fecal occult blood test (FOBT) results. Primary Aims: 1. To implement a colorectal cancer screening event notification system intervention (CRC-ENS) to improve complete evaluation of patients with a positive FOBT at four selected VA Medical Centers; 2. To conduct formative evaluation to identify implementation barriers and facilitators and to guide modifications of the CRC-ENS; 3. To conduct an outcome evaluation to determine the effectiveness of the intervention to: a. increase the proportion of patients with a positive FOBT receiving CDE; b. reduce the time-lag between notification of a positive FOBT result and scheduling of a follow-up endoscopic procedure. Colorectal cancer is the second leading cause of cancer-related deaths in the United States. Results from randomized clinical trials and intervention studies have suggested that implementation of a CRC screening program for men and women over 50 years of age results in reduced CRC mortality. However, for this reduction in mortality to be fully realized, it is imperative that all positive screening tests are followed by complete diagnostic evaluation (CDE). Numerous intervention programs have been used to improve initial CRC screening rates. However, data indicate that outside of the research setting, less than half of patients with a positive FOBT screening result undergo CDE. To enhance the translation of this best practice recommendation to clinical practice, we propose to implement an electronic event notification intervention (CRC-ENS) directed at making physician and system level changes to increase the proportion of patients with an abnormal FOBT that undergo CDE. The CRC-ENS intervention employs a relatively simple alteration to the current electronic mechanism for notifying the primary

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	care clinician of when a positive FOBT is recorded. With the CRC-ENS, this notification will be forwarded to the gastroenterology (GI) clinic as well as the primary care provider (PCP). This notification at the GI clinic will set off a cascade of events that would normally only be triggered by a consult request from the PCP. In this translation study, eight participating VHA sites will be randomly assigned to either the CRC-ENS intervention or comparison group. The proposed project will take two years to complete. During the first three months project start-up activities, including recruitment and randomization of sites will be conducted. During months three to six pre-intervention change of awareness strategies will be carried out at all intervention sites. The CRC-ENS intervention will be implemented in months six to 18 and formative evaluation, including three sets of focus groups will be carried out throughout the intervention period. Post-intervention data collection, outcome evaluation and dissemination of results will be carried out in months 18-24.
CRC Neo	Case Control Study: A Pilot Case Control Study of Risk Factors for Advanced Sporadic Colorectal Neoplasia Prior to Age 50. Imperiale, Thomas ASGE Abstract not available.
CRC Endo2	Empirical Predictors of Endoscopy Non-Completion Kochevar, Laura Core LIP OBJECTIVES: To identify predictors of non-completion of GI endoscopy appointments. RESEARCH DESIGN/METHODOLOGY: The data to be requested are de-identified patient-level data for patients between 50 and 80 years of age who were scheduled for at least one GI endoscopy clinic appointment in FY 2002. Data to be requested from the VISTA/CPRS system are: Patient age, gender, estimated distance between home and Minneapolis VAMC, race, eligibility, computed severity, complexity, and comorbidity, number of primary care visits scheduled in FY 2002, the number of primary care visits completed in FY2002, the number of specialty visits scheduled in FY 2002, the number of specialty visits completed, the number of GI endoscopies scheduled in FY 2002, the number and type of GI endoscopies completed in FY 2002, whether the endoscopy was for screening or diagnosis, the season in which the endoscopies where scheduled to occur, appointment proximity to a major holiday, time interval between the scheduling date and the appointment date, and the completion status of the appointment (complete, or non-completion type). Principal components analysis will be used to describe relationships among variables. Multivariate logistic regression will be used to identify predictors of non-completion of appointments and non-completion type. CLINICAL SIGNIFICANCE: While it is clear that incomplete endoscopy appointments add to both the cost and wait times for endoscopies, the degree of impact and the most appropriate intervention strategies are determined by the nature of the non-completion. There are 4 distinct type of non-completion: 1) Patient calls ahead to cancel; 2) The patient does not come to the clinic and does not call ahead; 3) The patient shows up at the clinic and refuses test, or reports that no prep was done, or was otherwise non-compliant with necessary procedures (e.g. ate breakfast); and 4) Patient arrives, is prepped for procedure (sedated, etc.). The exam is initiated and cannot be completed because of inadequate at-home pre-procedure purging. Type 1 and Type 2 non-completions may be addressed by altering scheduling and feedback procedures. Types 3 and 4 cancellations suggest the need for greater patient education and motivation and may also indicate the need for pre-exam reminder calls, intensive coaching, and possibly pre-exam “hot line” availability. Type 4 cancellations also suggest the need for

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	thorough pre-procedure evaluation to determine full compliance with prep. It is not economically feasible to apply all support methods for all patients. If patients who were particularly at-risk for a specific type of clinic cancellation could be identified, the appropriate intervention strategy might be applied only when needed. If the non-completion rate were significantly lowered, the cost savings alone may be sufficient to pay for ongoing supportive intervention. There would also be the additional benefit of increasing the effective endoscopic capacity and decreasing wait times for these procedures.
CMO	CMO/QMO Survey of VA Colorectal Screening and Diagnosis Practices Kochevar, Laura CRC QUERI LIP This rapid-response technical assistance effort provided analysis and interpretive support to a survey effort initiated by the CMO/QMO workgroup. The survey consisted of two components, a chart review of the last 20 colorectal cancer cases diagnosed in each of 150 VA Facilities and a survey of facility resources, policies and processes. Limitations of the survey are variations in who provided the information for each facility and known inaccuracies in responses, compared with independent validation undertaken by CRC QUERI. A major finding of the chart review is that 48% of patients diagnosed with CRC cancers presented with signs and symptoms, despite high screening rates among primary care users. The survey responses indicate that management perceive staffing shortages as the major rate limiting factor in providing prompt follow up of positive screening tests, despite empirical findings from other studies (e.g. Endo !) showing that patient adherence failure is the chief driver of CDE delay.
GI FAC	GI Leadership Opinion Survey Kochevar, Laura CRC QUERI LIP This rapid-response technical assistance effort provided design and analysis support to the GI Field advisory leadership opinion study. The study was conducted using interactive keypad response during a special VA provider meeting at the 2004 Digestive Disease Week Conference. Thirty-five percent of the 62 respondents where chiefs of GI service across 18 VA VISNs. The remainder expressed views consistent with the USPSTF that the choice of screening modality should be the result of a shared decision making process between provider and patient. Asked which screening modality they would choose for themselves or recommend to a family member, 90% chose screening colonoscopy. Position within the VA (Service Chief vs. Provider) was not related to opinion. Respondents with USPSTF-consistent views were more likely to cite the lack of a sufficient evidence base and concerns about safety as reasons for their views. All respondents expressed the opini9on that implementing screening colonoscopy within the VA would result in an increase in adverse events, increased clinic wait times and delay of non-CRC-related GI procedures. Respondents cited staffing shortages as the principal barrier to the safe implementation of screening colonoscopy.
Key Informant	Key Informant Interview Study of CDE Policies and Procedures Kochevar, Laura CRC QUERI LIP The VACO LIP is a rapid-turn-around diagnostic effort that replaces the QUERI's original planned SRD key informant interview

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	project. Based on the findings of our previous endoscopic capacity and throughput study (Endo 1) we have identified highly efficient “best practice” Complete Diagnostic Evaluation (CDE) facilities and poorly performing CDE facilities. Key informants representing primary care providers, GI providers and GI nursing and clinic staff are being interviewed to uncover clinic processes related to best practice and barriers to best practice.
CRC Sc Delivery & Utilization	K07 CA90359 01 Delivery and Utilization of Colorectal Cancer Screening Ling, Bruce NIH/NCI The goal of this project is to comprehensively assess the impact of the interactive forces between patients, providers and the health care system on provider delivery and patient utilization of colorectal cancer screening services.
CRC Sc & Endo	PERT-51 Ling, Bruce (Co-investigator); (Weissfeld – PI) Coordinated Endoscopic Colorectal Cancer Screening CDC This study will implement and evaluate a comprehensive, coordinated and systematic approach to promoting routine colorectal cancer screening within a typical primary care physician network.
TECS	R01CA84140-01A1 Increasing Colon Cancer Screening in Primary Care Myers, Ronald E. NCI The American Cancer Society recommends that men and women 50 or more years of age have an annual fecal occult blood test (FOBT) and a flexible sigmoidoscopy (FS) examination every five years to screen for colorectal cancer (CRC). Alternative CRC screening regimens that are recommended include having a barium enema x-ray (BE) at five-year intervals or a colonoscopy (CX) every .10 years. Compliance with CRC screening guidelines is low. The proposed study, Increasing Colon Cancer Screening in Primary Care, is intended to develop and test methods that may be used to increase CRC screening compliance. Study participants will be male and female patients of a large, urban primary care practice (Jefferson Family Medicine Associates), who are 50 to 74 years of age and are at average risk for CRC according to American Cancer Society guidelines. After a Baseline Survey and Baseline Chart Audit are completed, 1,488 study participants will be randomly assigned either to a Control Group, a Standard Intervention (SI) Group, a. Tailored Intervention (TI) Group, or a Tailored Intervention plus Phone (TIP) Group. During a two-year period, the Control Group will receive usual care, while the intervention groups will be provided two annual screening interventions, The SI Group will receive a standard CRC screening invitation letter, a CRC screening kit (an educational booklet, and an educational videotape, and FOBTs) and a standard reminder letter. The TI Group will receive a tailored CRC screening invitation letter, a CRC screening kit, and a tailored reminder letter. Here, educational messages tailored

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	to participant stage of decision making about screening will be embedded in the letters. The TIP Group will receive the same intervention as the TI Group, plus a tailored telephone counseling call to amplify educational messages in the tailored screening invitation letter. Midpoint and Endpoint Surveys will be administered and an Endpoint Chart Audit will be completed for study participants. Specific aims of the study include the following: (1) Assess the impact of study interventions on screening compliance. (2) Assess the impact of study interventions on screening decision-making stage, (3) Assess the impact of study interventions on defined cognitive and psychosocial variables, (4) Identify variables associated with screening compliance and decision-making stage, (5) Evaluate intervention cost effectiveness relative to screening compliance.
GENOME	273-MH-219389 Decision Counseling For Colon Cancer Susceptibility Testing Myers, Ronald E. NIH The goal of this study is to develop methods that may be used to prepare patients to make informed decisions about genetic testing to determine colorectal cancer susceptibility.
GERA	ME-01-329 Increasing Early Detection of Gastrointestinal Cancer Myers, Ronald E. Pennsylvania Commonwealth The goal of this study is to identify a population of high-risk colon cancer and develop methods of approaches to facilitate/increase the use of screening tests in that group.
Data Management	273-MH-219390 Decision Counseling for Colon Cancer Susceptibility Testing – Data Management Myers, Ronald E. NCI For Abstract see GENOME.
CRC VA Cost	*CSP707D* *Colorectal Cancer Screening in the VA: A Cost Utility Analysis* *Provenzale, Dawn* *VA CSP* Abstract not available.

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Cost Utility	*VA CSP 380* *Screening for Colorectal Cancer in Asymptomatic Adults: A Cost Utility Analysis* *Provenzale, Dawn* *VA CSP* Colorectal cancer affects approximately 133,500 people in the United States each year and is responsible for approximately 55,000 deaths. Screening with fecal occult blood testing and sigmoidoscopy with removal of adenomatous polyps (colon cancer precursors) is effective in reducing cancer incidence and mortality. Therefore, the American Cancer Society recommends annual fecal occult blood testing and sigmoidoscopy every 3-5 years beginning at age 50 and the US Preventative Task Force recommends annual fecal occult blood testing and periodic flexible sigmoidoscopy. Sigmoidoscopy, highly sensitive for detecting early cancer and adenomas, examines only the distal colon and may not detect one-half of asymptomatic colon neoplasms. The estimated cost to prevent one cancer with this recommended strategy is approximately $200,000 per patient in a 10 year period ($2,670,000,000/10 years to prevent the incident cases of cancer). Effective colon screening might use the more sensitive colonoscopy or might target colonoscopy towards high risk individuals. Currently, there is no method to identify a high risk group. VA Cooperative Study #380 has been designed to evaluate historical or environmental factors, or biological markers of increased risk. It is unlikely, however, that the factors under study in CSP #380 alone, or the biological marker studies that require considerable expertise, and are not widely available, will provide the information needed to develop screening policy. CSP #380 will, however, provide new information on the incidence and prevalence of polyps and cancer in asymptomatic individuals. This proposed study will measure the effectiveness and cost-effectiveness of three alternative screening strategies: A) Colonoscopy every 10 years beginning at age 50. B) Barium enema. C) Annual fecal occult blood testing and flexible sigmoidoscopy every 5 years beginning at age 50. D) Annual fecal occult blood testing. E) No screening. For those who are diagnosed with adenomas at the time of screening, two alternative follow-up strategies, (according to the revised, approved CSP #380 protocol) will be evaluated: 1) colonoscopy at 2-3 years and at 5 years, and 2) colonoscopy at 5 years only. Critical to successful screening is patient acceptance of screening procedures and compliance with recommendations. We have measured individual preferences (utilities) and attitudes regarding colon cancer screening and the quality of life with a subtotal colectomy, colostomy, and colon cancer (possible outcomes of screened and unscreened patients) in four groups: 1-csp) subjects enrolled in CSP #380, 2-screened) outpatients with no symptoms of colon cancer who receive the currently recommended screening (annual fecal occult blood testing and flexible sigmoidoscopy every 5 years), 3-unscreened) outpatients with no symptoms suggestive of colon cancer, who are not receiving the currently recommended screening program, and 4-crca) all patients diagnosed with colon cancer at the Durham VA Medical Center. The results will be incorporated into the decision model to provide baseline estimates for these critical parameters. Sensitivity analysis will be performed to examine the effects of variability in patient preferences on the preferred strategy. Recruitment for CSP #380 began in 1/94 and will end in 1/97. Thus members of the cohort have been followed for up to 2.5 years to date. We propose a four year study to prospectively measure health care utilization and resource costs to the Department of Veterans Affairs for members of the groups described above. They will be incorporated into a decision model with primary data (from CSP #380) on the prevalence and incidence of polyps and cancer and the risks of screening colonoscopy. The model will calculate the incremental cost-utility ratio (additional cost/additional quality-adjusted life year gained) for each strategy from the perspective of the Department of Veterans Affairs. The results can be used to select the most effective screening strategy based on patient preferences, and to develop an acceptable, cost-effective colon cancer screening policy in the Department of Veterans Affairs.

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VA CanCORS	CRS 02-164 Colorectal Cancer Care Outcomes Research and Quality Surveillance Data System (CanCORS) Provenzale, Dawn & van Ryn, Michelle NCI/HSR&D OBJECTIVES: The Cancer Care Outcomes Research and Surveillance (CanCORS) Consortium is a collaboration of seven teams of investigators from around the United States, and is funded by the National Cancer Institute (6 teams) and VA Research Service (this team: Morrison, van Ryn, Provenzale) to evaluate the quality of cancer care in this country. The goal of the CanCORS Consortium is to examine the care delivered to population-based cohorts of newly diagnosed patients with lung and colorectal cancer in multiple regions of the country and to assess outcomes associated with that care. Where possible, the consortium will examine the degree to which those differences in care are associated with differences in outcomes. The study will be presented to potential participants under the name VA CanCORS-Share Thoughts on Care. The primary objectives of VA CanCORS-Share Thoughts on Care will be to examine the influence of the characteristics and beliefs of colorectal cancer patients and providers, as well as the characteristics of systems of organizations delivering care, on the treatment and outcomes of cancer patients from diagnosis to recovery or death. The secondary objectives will be to evaluate the effects of a select group of common and specific processes of care on clinical outcomes. RESEARCH PLAN: Each of the 7 Primary Data Collection and Research (PDCR) sites will identify cohorts of approximately 1000 patients with colorectal or lung cancer and will collect data about their care in the 15 months following diagnosis. The VA team will focus on colorectal cancer only. Primary data will be collected from 3 sources: patient surveys, medical records, and surveys of health care providers. These data will be supplemented with cancer registry data and publicly available data sets. CLINICAL SIGNIFICANCE: The CanCORS Consortium, including VA CanCORS-Share Thoughts on Care, provides a unique opportunity to examine care for lung and colorectal cancer patients in community settings in multiple regions of the United States, to identify variations in care, and to begin to understand the reasons for these variations. By collecting and analyzing data from a large number of patients in geographically diverse settings and care systems, we expect that the findings of this study will help clinicians and policy-makers improve cancer care and the experiences of cancer patients.
Screen GI	1K-24-DK02926-01 Screening Surveillance for GI Malignancies Provenzale, Dawn NIH Examine the effectiveness and cost-effectiveness of gastrointestinal cancer screening and surveillance programs. In addition, train physicians on mentoring of GI fellows committed to careers in health services research.

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CRC SAFE	CRS 02-162 Colorectal Cancer Screening Assessment and Surveillance Data System Kochevar, Laura NCI Recent data from the VA Office of Quality and Performance suggest that, on average, 40% of VA patients fail to receive timely CRC screening, and little is known about compliance with CRC follow-up recommendations. Significant improvements in screening and follow-up rates can only be achieved with thorough knowledge of variations in recommended CRC screening and follow-up practice. The features and functionality necessary to consistently and effectively track the colorectal cancer screening and follow-up activities of all eligible veteran VHA users for assurance purposes are not currently present in the extensive VA data systems. Hence, a new, centralized colorectal cancer screening and follow-up data system is needed that will facilitate access to relevant data from multiple sources, while at the same time establishing and maintaining data quality, integrity, and security. We propose to build a centralized CRC screening assessment and surveillance system which will compliment other VA national data sets by providing: (1) an infrastructure for facility-level CRC surveillance and quality assurance programs, and (2) a larger sample for assessing CRC practices in special patient populations, and for care tracking screening complications and other rare outcomes. The information in this data system will be supplemented with Medicare and chart review data for validation purposes. OBJECTIVES. The long term goal of this project is to develop and implement a valid and efficient national Veterans Affairs (VA) data system that can be used to: (1) assess and monitor adherence to recommended colorectal cancer (CRC) screening and follow-up practices and their outcomes in the VA, (2) inform and facilitate interventions to improve CRC screening and follow-up practices, and (3) evaluate specific improvement strategies. The immediate objectives are to: (1) develop a data system prototype, using a sample of VA facilities, (2) develop and validate operational definitions of recommended screening and follow-up practices using VA and Medicare data, and (3) develop a functional approach for obtaining, linking and managing the components of this data system on a national scale. Rather than testing specific research hypotheses, this project will seek to develop and implement a CRC screening and surveillance system that can be used to estimate: (1) CRC screening and follow-up rates, (2) variation in screening and follow-up rates by organizational and patient characteristics, (3) the reliability and validity of combined VA and Medicare administrative databases for assessing and tracking recommended CRC screening and follow-up practices, and (4) the impact of Medicare service coverage on the screening and follow-up rates of VA users. SIGNIFICANCE. The development of such a screening and surveillance system will facilitate data linkages, analyses, complex ad hoc queries, graphical depiction of data relationships, and other reporting functions. The potential uses and benefits that such a surveillance system would provide the VA are manifold and include: an increased ability to quickly gather national datasets for examination of issues related to CRC screening and follow up care; a centralized data system for monitoring and evaluating aspects of the quality CRC screening and follow-up services provided by the VA's health care system; and a centralized data collection system for rapidly assessing and evaluating the impact of specific CRC screening and follow-up improvement projects. The data system resulting from this project will provide a foundation for future CRC screening and follow-up quality improvement efforts and can be used to: (1) assess national and local adherence to recommended CRC screening and follow-up practices on an annual basis, (2) identify gaps in recommended practices, (3) facilitate evaluation of strategies for reducing these gaps, and (4) trigger computerized notification and prompting strategies for enhancing compliance with recommended CRC practices. The final report summarizing adherence to recommended CRC screening and follow-up practices, variation in adherence by patient and facility level characteristics, and areas of greatest need for the sample of VA facilities used to develop the data system will provide a prototype for national reporting by the CRC QUERI..

Project Label	Abstract
Tailored CRC	R01 CA97263 Tailored Interactive Intervention to Increase CRC Screening Vernon, Sally NIH/NCI Colorectal cancer (CRC) is the 2nd leading cause of cancer deaths in the U.S. and CRC risk increases with age. Most organizations suggest that, for those at average risk, screening should be initiated at age 50. Colorectal cancer screening (CRCS) is cost-effective and offers the possibility of early detection as well as prevention. However, the use of every CRCS test is low and has not increased substantially in recent years. Clearly, interventions to increase screening are needed. The primary goal of this 5-year research project is to conduct a prospective randomized trial of a tailored interactive computer-based intervention to increase patient completion of CRCS among patients aged 50-64 years in a multi-specialty primary care practice in Houston, TX. A stratified random sample based on sex and prior screening history will be recruited. The primary outcome will be completion of any CRCS test (following ACS guidelines) within 6 months of the intervention. Secondary goals are to increase understanding of factors that predict completion of CRCS and to assess the cost-effectiveness of the intervention. The transtheoretical (stages of change) model will be used to guide intervention development. To implement our specific aims we will use Intervention Mapping, a framework for systematic health promotion program planning that incorporates theory and empiric evidence to identify determinants of a behavior, develop intervention objectives, and select methods and strategies for an intervention. The intervention will be delivered immediately prior to a patient's clinic visit via a personal computer installed in the clinic's Patient Education Center. It will be an interactive audiovisual program tailored to a participant's status on a series of variables including readiness to engage in CRCS. The interactive program will generate a checklist of questions and concerns identified by the patient that can be used to initiate a discussion about CRCS with the physician. Two comparison groups will be included: a no-contact control group and a control group who receive generic printed CRCS educational materials immediately prior to their clinic visit. All three groups will involve the provision of a physician reminder placed in the medical chart prior to the clinic visit. Telephone follow-up and medical record review will be conducted 6 months after delivery of the intervention to ascertain completion of CRCS.
Org CRC	CRS 02-163-1 Organizational Variations in Colorectal Cancer Screening Rates Yano, Elizabeth HSR&D OBJECTIVES. Colorectal cancer (CRC) is the third most common cancer among men and women in the U.S. and ranks second among cancer death causes. Over 2,000 cases are diagnosed in VA patients each year. Recent studies have demonstrated that CRC screening is effective in the prevention and early detection of CRC. Despite the strength of this evidence, less than one-third of CRCs are found at an early stage. This project will assess geographic variations (i.e., by region, by urban vs. rural location) in CRC screening rates among VA health care facilities. We will analyze VA organizational characteristics associated with high and low CRC screening rates. RESEARCH PLAN. We will obtain CRC screening data through the Office of Quality & Performance's (OQP) External Peer Review Program (EPRP) for FY2001. The EPRP program conducts a periodic random sampling of patient charts from each VA facility. Organizational data will be obtained from the VHA Survey of Primary Care

Project Label	Abstract
	Practices (1999-00), reflecting over 200 organizational and practice features among 219 geographically distinct VA primary care practices, and other administrative data. Sample measures include environmental features (e.g., region, urban/rural location, managed care penetration), organizational characteristics (e.g., academic affiliation, complexity/size, leadership characteristics), and primary care practice structure (e.g., service line organization, staffing, practice arrangements with specialists, fiscal structure and resource changes, decision support, and managed care practices). METHODS. Simple frequencies and histograms of the variability in CRC screening in VA settings will be analyzed and presented for overall variation assessments. The outcome variables of interest will include overall screening penetration rates (any screening modality), as well as screening rates for specific modalities (FOBT, sigmoidoscopy, and colonoscopy). We will then conduct multivariate analyses to examine the organizational characteristics independently associated with CRC screening rates in VA practices. We will examine the utility of (1) simple linear regression, using different approaches to address the likely skewed distribution of CRC screening rates, (2) logistic regression, identifying appropriate cutpoints in CRC screening rates for use in dichotomizing screening performance in line with OQP and CRC-QUERI strategic goals, and (3) hierarchical linear regression, adjusting for the potential clustering of patients within practices and aiming to assess the contribution of different levels of the organization on screening performance. These structure-outcome models will be used to advance the knowledge of the factors associated with VA performance of CRC screening nationwide. FINDINGS, RESULTS, CONCLUSIONS REACHED TO DATE: In VHA, the Office of Quality & Performance has reported a national average of 32% of patients over age 52 with 3+ visits in a given year failing to receive timely CRC screening, while VISN-level screening failure rates range from 22%-44% (CRC-QUERI Strategic Plan, 2002). To date, VA health policy makers and health care managers lack needed information about the determinants of variations in CRC screening across the VA healthcare system.

Appendix 1

Summary of Colorectal Cancer Screening, Diagnosis and Treatment Guidelines

Source	Population	CRCS	CDE	RT
American Cancer Society	Asymptomatic, average risk persons aged 50 or older	Any of: • Annual FOBT[3] • FS every 5 years • Annual FOBT + FS every 5 years • CS every 10 years • DCBE every 5 years	Colonoscopy If CS is unavailable or unacceptable to the patient, DCBE or DCBE + FS	Surgery: All stages, LA resection when possible, AP resection when necessary. Chemo & Radiation: Stage I: none Stage II or III Chemo +/- Radiation
American College of Gastroenterology (Bond)	Asymptomatic, average risk persons aged 50 or older	Any of: • Annual FOBT • FS every 5 years • Annual FOBT + FS every 5 years • CS every 10 years • DCBE every 5 years	Colonoscopy	
American Gastroenterological Association	Asymptomatic, average risk persons aged 50 or older	Any of: • Annual FOBT • FS every 5 years • CS every 10 years • DCBE every 5 years	Colonoscopy If CS is unavailable or unacceptable to the patient, DCBE or DCBE + FS	No guideline
National Comprehensive Cancer Network	Asymptomatic, average risk persons aged 50 or older	Any of: • Annual FOBT + FS every 5 years • CS every 10 years • DCBE every 5 years	If screened by FS or CS, biopsy, otherwise, CS + biopsy	Surgery: All stages, LA resection when possible, AP resection when necessary. Chemo & Radiation: Stage I: none Stage II or III Chemo +/- Radiation
US Preventive Services Task Force (A recommendation)	Asymptomatic, average risk persons aged 50 or older	Any of: • Annual FOBT • FS every 5 years • CS every 10 years • DCBE every 5 years	Colonoscopy	No guideline
VHA, OQP Performance Measure	Veterans age 52 or older	Any of: • Annual FOBT • FS every 5 years • CS every 10 years	No guideline or performance measure	No guideline or performance measure

[3]FOBT= Fecal occult blood test, FS=Flexible sigmoidoscopy, CS=Colonoscopy, DCBE=Double contrast barium enema

Appendix 2
Summary of Colorectal Cancer Treatment Standards of Practice and Associated Evidence

PDQ Colon Cancer
Health Professional Version
Date Last Modified: 02/10/2004
http://www.cancer.gov/cancerinfo/pdq/treatment/colon/healthprofessional/

General Information

Note: Some citations in the text of this section are followed by a level of evidence. The PDQ editorial boards use a formal ranking system to help the reader judge the strength of evidence linked to the reported results of a therapeutic strategy. (Refer to the PDQ summary on Levels of Evidence [5] for more information.)

Cancer of the colon is a highly treatable and often curable disease when localized to the bowel. Surgery is the primary form of treatment and results in cure in approximately 50% of patients. Recurrence following surgery is a major problem and is often the ultimate cause of death.

Prognostic Factors

The prognosis of patients with colon cancer is clearly related to the degree of penetration of the tumor through the bowel wall, the presence or absence of nodal involvement, and the presence or absence of distant metastases. These 3 characteristics form the basis for all staging systems developed for this disease. Bowel obstruction and bowel perforation are indicators of poor prognosis.[1] Elevated pretreatment serum levels of carcinoembryonic antigen (CEA) have a negative prognostic significance.[2]

Many other prognostic markers have been evaluated retrospectively for patients with colon cancer, although most, including allelic loss of chromosome 18q or thymidylate synthase expression, have not been prospectively validated.[3-12] Microsatellite instability, also associated with hereditary nonpolyposis colon cancer (HNPCC), has been shown to be associated with improved survival independent of tumor stage in a population-based series of 607 patients younger than 50 years with colorectal cancer.[13] Treatment decisions depend on factors such as physician and patient preferences and the stage of the disease rather than the age of the patient.[14-16] Racial differences in overall survival after adjuvant therapy have been observed, without differences in disease-free survival, suggesting that comorbid conditions play a role in survival outcome in different patient populations.[17]

Risk Factors

Because of the frequency of the disease, ability to identify high-risk groups, demonstrated slow growth of primary lesions, better survival of patients with early-stage lesions, and relative simplicity and accuracy of screening tests, screening for colon cancer should be a part of routine care for all adults starting at age 50, especially for those with first-degree relatives with colorectal cancer. Groups that have a high incidence of colorectal cancer include those with hereditary conditions, such as familial polyposis, HNPCC or Lynch syndrome variants I and II, and ulcerative colitis.[18] Together they account for 10% to 15% of colorectal cancers. Patients with HNPCC reportedly have better prognoses in stage-stratified survival analysis than patients with sporadic colorectal cancer, but the retrospective nature of the studies and possibility of selection factors make this observation difficult to interpret.[19] [Level of evidence: 3iiiA] More common conditions with an increased risk include a personal history of colorectal cancer or adenomas; first-degree family history of colorectal cancer or adenomas; and a personal history of ovarian, endometrial, or breast cancer.[20,21] These high-risk groups account for only 23% of all colorectal cancers. Limiting screening or early cancer detection to only these high-risk groups would miss the majority of colorectal cancers.[22] (Refer to the PDQ summaries on Screening for Colorectal Cancer [1] and Prevention of Colorectal Cancer [2] for more information.)

Follow-up

Following treatment of colon cancer, periodic evaluations may lead to the earlier identification and management of recurrent disease.[23-26] The impact of such monitoring on overall mortality of patients

with recurrent colon cancer, however, is limited by the relatively small proportion of patients in whom localized, potentially curable metastases are found. To date, no large-scale randomized trials have documented the efficacy of a standard, postoperative monitoring program.[27-31] CEA is a serum glycoprotein frequently used in the management of patients with colon cancer. A review of the use of this tumor marker suggests the following:[32]

- A CEA level is not a valuable screening test for colorectal cancer due to the large numbers of false-positive and false-negative reports.
- Postoperative CEA testing should be restricted to patients who would be candidates for resection of liver or lung metastases.
- Routine use of CEA levels alone for monitoring response to treatment should not be recommended.

The optimal regimen and frequency of follow-up examinations are not well defined, however, because the impact on patient survival is not clear and the quality of data is poor.[29-31] New surveillance methods, including CEA immunoscintigraphy [33] and positron emission tomography, are under clinical evaluation.

Gastrointestinal stromal tumors can occur in the colon. (Refer to the PDQ summary on Adult Soft Tissue Sarcoma Treatment [6] for more information.)

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Cellular Classification

Histologic types of colon cancer include the following:

- Adenocarcinoma (most colon cancers).
    - Mucinous (colloid) adenocarcinoma.
    - Signet ring adenocarcinoma.
- Scirrhous tumors.
- Neuroendocrine.[1] Tumors with neuroendocrine differentiation typically have a poorer prognosis than pure adenocarcinoma variants.

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Stage Information

Treatment decisions should be made with reference to the TNM classification,[1] rather than the older Dukes' or the Modified Astler-Coller (MAC) classification schema.

The American Joint Committee on Cancer (AJCC) has designated staging by TNM classification.[1]

TNM definitions

Primary tumor (T)

- TX: Primary tumor cannot be assessed
- T0: No evidence of primary tumor
- Tis: Carcinoma in situ: intraepithelial or invasion of the lamina propria*
- T1: Tumor invades submucosa
- T2: Tumor invades muscularis propria
- T3: Tumor invades through the muscularis propria into the subserosa, or into nonperitonealized pericolic or perirectal tissues
- T4: Tumor directly invades other organs or structures, and/or perforates visceral peritoneum**,***

* [*Note: Tis includes cancer cells confined within the glandular basement membrane (intraepithelial) or lamina propria (intramucosal) with no extension through the muscularis mucosae into the submucosa.*]

** [*Note: Direct invasion in T4 includes invasion of other segments of the colorectum by way of the serosa, for example, invasion of the sigmoid colon by a carcinoma of the cecum.*]

*** [*Note: Tumor that is adherent macroscopically to other organs or structures is classified T4. If no tumor is present in the adhesion microscopically, however, the classification should be pT3. The V and L substaging should be used to identify the presence or absence of vascular or lymphatic invasion.*]

Regional lymph nodes (N)

- NX: Regional nodes cannot be assessed
- N0: No regional lymph node metastasis
- N1: Metastasis in 1 to 3 regional lymph nodes
- N2: Metastasis in 4 or more regional lymph nodes

[*Note: A tumor nodule in the pericolorectal adipose tissue of a primary carcinoma without histologic evidence of residual lymph node in the nodule is classified in the pN category as a regional lymph node metastasis if the nodule has the form and smooth contour of a lymph node. If the nodule has an irregular contour, it should be classified in the T category and also coded as V1 (microscopic venous invasion) or as V2 (if it was grossly evident), because there is a strong likelihood that is represents venous invasion.*]

Distant metastasis (M)

- MX: Distant metastasis cannot be assessed
- M0: No distant metastasis
- M1: Distant metastasis

AJCC stage groupings

Stage 0

- Tis, N0, M0

Stage I

- T1, N0, M0
- T2, N0, M0

Stage IIA

- T3, N0, M0

Stage IIB

- T4, N0, M0

Stage IIIA

- T1, N1, M0
- T2, N1, M0

Stage IIIB

- T3, N1, M0
- T4, N1, M0

Stage IIIC

- Any T, N2, M0

Stage IV

- Any T, Any N, M1

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Treatment Option Overview

Note: Some citations in the text of this section are followed by a level of evidence. The PDQ editorial boards use a formal ranking system to help the reader judge the strength of evidence linked to the reported results of a therapeutic strategy. (Refer to the PDQ summary on Levels of Evidence [5] for more information.)

Drug combinations described in this section:

- AIO regimen (folic acid, fluorouracil (5-FU), irinotecan):
    - Irinotecan (100 mg/m^2) as a 2-hour infusion day 1; leucovorin (500 mg/m^2) as a 2-hour infusion day 1; followed by 5-FU (2,000 mg/m^2) intravenous (IV) bolus via ambulatory pump over 24 hours weekly x 4 every 52 weeks.
- FOLFOX4 regimen (oxaliplatin, leucovorin, 5-FU):
    - Oxaliplatin (85 mg/m^2) as a 2-hour infusion day 1; leucovorin (200 mg/m^2) as a 2-hour infusion days 1 and 2; followed by a loading dose of 5-FU (400 mg/m^2) IV bolus, then 5-FU (600 mg/m^2) via ambulatory pump over 22 hours days 1 and 2 every 2 weeks.
- FOLFOX6 regimen (oxaliplatin, leucovorin, 5-FU):
    - Oxaliplatin (85-100 mg/m^2) as a 2-hour infusion day 1; leucovorin (400 mg/m^2) as a 2-hour infusion day 1; followed by a loading dose of 5-FU (400 mg/m^2) IV bolus on day 1, then 5-FU (2,400-3,000 mg/m^2) via ambulatory pump over 46 hours every 2 weeks.
- FOLFIRI regimen (folic acid, 5-FU, irinotecan):
    - Irinotecan (180 mg/m^2) as a 2-hour infusion day 1; leucovorin (400 mg/m^2) as a 2-hour infusion day 1; followed by a loading dose of 5-FU (400 mg/m^2) IV bolus on day 1, then 5-FU (2,400-3,000 mg/m^2) via ambulatory pump over 46 hours every 2 weeks.
- IFL (or Saltz) regimen (irinotecan, 5-FU, leucovorin):
    - Irinotecan (125 mg/m^2), 5-FU (500 mg/m^2) IV bolus and leucovorin (20 mg/m^2) IV bolus weekly for 4 out of 6 weeks.
- NCCTG regimen (5-FU, levamisole):
    - Bolus 5-FU (450 mg/m^2 per day) days 1 to 5, then weekly 28 days later plus levamisole (50 mg) orally 3 times a day for 3 days every 2 weeks.
- NCCTG regimen (5-FU, low-dose leucovorin):
    - Bolus 5-FU (450 mg/m^2) plus leucovorin (20 mg/m^2) daily for 5 days every 28 days.
- NSABP regimen (5-FU, high-dose leucovorin):
    - Bolus 5-FU (500 mg/m^2) plus leucovorin (500 mg/m^2) weekly for 6 consecutive weeks every 8 weeks.

Primary surgical therapy

Standard treatment for patients with colon cancer has been open surgical resection of the primary and regional lymph nodes for localized disease. The role of laparoscopic techniques [1-4] in the treatment of colon cancer is under evaluation in a multicenter prospective randomized trial comparing laparoscopic-assisted colectomy (LAC) to open colectomy.[5] The quality-of-life component of this trial has been published and reported minimal short-term quality-of-life benefits with LAC.[6] [Level of evidence: 1iiC] One small, single institution randomized study of 219 patients showed that the LAC procedure was independently associated with reduced tumor recurrence on multivariate analysis.[7] [Level of evidence: 1iiB] The role of sentinel lymph node mapping is also under clinical evaluation.[8]

When resection can be performed with clear margins, patients whose tumors extend through the bowel wall and to adjacent structures have no worse prognosis than similarly staged patients without such invasion. Surgery is also curative in 25% to 40% of patients who develop resectable metastases in the liver. Improved surgical techniques and advances in preoperative imaging have allowed for better patient selection for resection.

Adjuvant chemotherapy

Chemotherapy regimens based on fluorouracil, leucovorin, and levamisole

Many early trials of adjuvant chemotherapy failed to show a significant improvement in either overall or disease-free survival for patients receiving treatment compared to concurrently randomized control patients receiving no adjuvant therapy.[9-12] These trials employed 5-FU alone or 5-FU plus semustine (methyl-CCNU). The North Central Cancer Treatment Group (NCCTG) conducted a randomized trial comparing surgical resection alone with postoperative levamisole or 5-FU-levamisole.[13] [Level of evidence: 1iiA] A significant improvement in disease-free survival was observed for patients with stage III (Dukes' C) colon cancer who received 5-FU-levamisole, but overall survival benefits were of borderline statistical significance. A survival benefit of approximately 12% (49% versus 37%) was seen in patients with stage III disease treated with 5-FU-levamisole.

In a large, confirmatory intergroup trial, 5-FU-levamisole prolonged disease-free and overall survival in patients with stage III colon cancer, compared to patients who received no treatment after surgery.[14] [Level of evidence: 1iiA] Levamisole alone did not confer these benefits. Subsequent studies tested the combination of 5-FU and leucovorin in the adjuvant treatment of patients with resected carcinoma of the colon. Results of multiple randomized trials that have enrolled over 4,000 patients comparing adjuvant chemotherapy with 5-FU-leucovorin to surgery or 5-FU-semustine-vincristine demonstrate a reduction in mortality of between 22% and 33% (3-year overall survival of 71% to 78% increased to 75% to 84%).[15-17]

Subsequently, 4 additional trials have explored whether shorter treatments and combinations of chemotherapy with leucovorin and levamisole or interferon impact survival. These studies have shown that treatment for 6 to 8 months with 5-FU-leucovorin is equivalent to 12 months, and that the addition of interferon does increase toxic effects without improving efficacy.[18-20] At this time, patients with stage III (Dukes' C) colon cancer should be considered for adjuvant therapy with 5-FU-leucovorin for 6 to 8 months.[19,21]

The NCCTG performed a trial comparing 6 months to 12 months of treatment using either 5-FU and levamisole or 5-FU, levamisole, and leucovorin for patients with stages II and III (Dukes' B and C or MAC B2, B3, and C1-3) colon cancer.[22] [Level of evidence: 1iiA] The trial showed that for equivalent survival benefit, the 5-FU plus levamisole regimen must be given for 12 months, while the 3-drug regimen could be administered over just 6 months. An intergroup trial with 4 treatment arms, including 5-FU-levamisole, 5-FU plus low-dose leucovorin (the NCCTG regimen), 5-FU plus high-dose leucovorin (the NSABP regimen), or 5-FU-leucovorin-levamisole, has been reported in preliminary fashion.[23] [Level of evidence: 1iiA] This study also demonstrated that 6 months of 5-FU-leucovorin is at least as effective as 12 months of 5-FU-levamisole. The NSABP C-04 study found equivalent results in overall survival for 1 year of 5-FU plus high-dose leucovorin when compared to 1 year of 5-FU-levamisole.[19] The addition of levamisole to 5-FU and leucovorin did not improve disease-free or overall survival. Mature data from NSABP C-05 suggest no survival benefit from the addition of interferon alfa-2a to 5-FU and high-dose leucovorin, but did note a substantial increase in grade 3 or higher toxic effects.[18]

Based on the outcomes of all of these trials, a recommendation was made at the 1997 American Society of Clinical Oncology meeting that any 1 of 3 regimens could be considered for postoperative treatment of patients with stage III colon cancer, all of which have resulted in a survival advantage over no postoperative chemotherapy. These include the following:

- NCCTG regimen (5-FU, levamisole) for 1 year.
- NCCTG regimen (5-FU, low-dose leucovorin) for 6 months.
- NSABP regimen (5-FU, high-dose leucovorin) for 6 months.

At this time, there are insufficient data to determine if there is any advantage to the 3-drug combination of 5-FU and leucovorin and levamisole over any of the previously noted 2-drug regimens. There are also insufficient data to distinguish whether high-dose, intermediate-dose, or low-dose leucovorin is most advantageous as a modulator of 5-FU. Pooled analysis of randomized trials indicate that elderly patients (>70 years) derived equal benefit from adjuvant treatment as younger individuals and should not be excluded from these treatments based solely on age.[24]

The potential value of adjuvant therapy for patients with stage II (Dukes' B or MAC B2 or B3) colon cancer also remains controversial. Investigators from the NSABP have indicated that the reduction in risk of recurrence by adjuvant therapy in patients with stage II disease is of similar magnitude to the benefit seen in patients with stage III disease treated with adjuvant therapy, although an overall survival advantage has not been established.[25] A randomized trial of postoperative 5-FU plus levamisole compared to surgery alone, however, showed no survival advantage to postoperative adjuvant chemotherapy.[26] A meta-analysis of 1,000 stage II patients whose experience was amalgamated from a series of trials indicates a 2% advantage in disease-free survival at 5 years when adjuvant therapy-treated patients treated with 5-FU-leucovorin are compared to untreated controls.[27] [Level of evidence: 1iiDi];[28] Patients with stage II colon cancer remain candidates for clinical trials in which either surgery alone or 5-FU-leucovorin represent standard therapy.[29-31]

Chemotherapy regimens based on irinotecan and oxaliplatin

After the development and approval of irinotecan and oxaliplatin for the treatment of patients with advanced colorectal cancer (see the Advanced disease section), these drugs are now being tested in patients with local or recurrent disease. Irinotecan is a topoisomerase-I inhibitor with a 10% to 20% partial response rate in patients with metastatic colon cancer.[32-35] Phase III trials have demonstrated improved response rates and prolonged overall survival with irinotecan combined with 5-FU-leucovorin when compared to 5-FU-leucovorin alone.[36,37]

The MOSAIC study compared the toxic effects and efficacy of FOLFOX4 with a 5-FU-leucovorin regimen administered for 6 months in 2,246 patients with resected stage II or III colon cancer. The preliminary results of the study with 37 months of follow-up demonstrated a significant improvement in disease-free survival at 3 years (77.8% versus 72.9%, P=.01) in favor of FOLFOX4.[38] Patients treated with FOLFOX4 experienced more frequent toxic effects consisting mainly of neutropenia (41% > grade 3) and reversible peripheral sensorial neuropathy (12.4% grade 3). These results are still preliminary, however, and information is lacking with regard to survival suggesting, that FOLFOX4 is a therapeutic option for patients with resected stage III colon cancer.[38]

Adjuvant radiation therapy

While combined modality therapy with chemotherapy and radiation therapy has a significant role in the management of patients with rectal cancer (below the peritoneal reflection), the role of adjuvant radiation therapy for patients with colon cancer (above the peritoneal reflection) is not well defined. Patterns-of-care analyses and single-institution retrospective reviews suggest a role for radiation therapy in certain "high-risk" subsets of colon cancer patients (T4, tumor location in immobile sites, local perforation, obstruction, residual disease postresection).[39-44] Such observations led to the development of a phase III randomized Intergroup study designed to test the benefit of adding radiation therapy to surgery and chemotherapy with 5-FU-levamisole for selected high-risk colon cancer patients (T4, or T3N1-2 ascending/descending colon).[45] This clinical trial closed early secondary to inadequate patient accrual, and analysis of 222 patients demonstrated no benefit for the group receiving radiation therapy with respect to relapse or overall survival. Therefore, adjuvant radiation therapy has no current standard role in the management of patients with colon cancer following curative resection.

Recurrent or advanced disease

Treatment of patients with recurrent or advanced colon cancer depends on the location of the disease. For patients with locally recurrent and/or liver-only and/or lung-only metastatic disease, surgical resection, if feasible, is the only potentially curative treatment. Patients with unresectable disease are treated with systemic chemotherapy.

Chemotherapy trials in patients with locally advanced, unresectable, or metastatic disease, typically with 5-FU-based regimens, demonstrated increased numbers of partial responses and prolongation of the time-to-progression of disease,[46,47] as well as improved survival and quality of life for patients receiving chemotherapy compared to best supportive care.[48-50] Several trials have analyzed the activity and toxic effects of various 5-FU-leucovorin regimens using different doses and administration schedules and showed essentially equivalent results with a median survival time in the 12-month range.[51] Subsequent studies incorporated irinotecan and oxaliplatin in the treatment of patients with advanced colorectal cancer. These new regimens have improved the response rate, time-to-tumor progression, and median survival of patients with advanced disease, with tolerable side effects. The median survival of these patients has improved from approximately 12 months in the mid 1990s to over 20 months in 2003.[36,37,52-54]

Irinotecan combined with 5-FU-leucovorin has demonstrated improved survival in patients with advanced or metastatic disease compared with 5-FU-leucovorin alone, albeit with increased, yet controllable, toxic effects.[32-35] Interim results from ongoing studies of oxaliplatin, alone or combined with 5-FU-leucovorin, may lead to further improvements in time-to-progression of disease and improved survival.[53,55-57] Continued participation in clinical trials is appropriate.

Currently there are several first-line and second-line chemotherapy regimens that can be used in patients with recurrent or advanced colorectal carcinoma.[34,36,37,48,52,58,59,52-54,60-63]

First-line chemotherapy treatment

With the lack of comparative head-to-head studies between many first-line and second-line regimens, the choice of one regimen versus another for first-line treatment depends on factors such as physician and patient preferences, comorbidities, and convenience, rather than efficacy parameters. In addition, the newer colorectal cancer chemotherapy schemas are serving as the platform on which combined novel targeted agents such as inhibitors of the epidermal growth factor receptor and vascular endothelial growth factor are based. Accepted first-line regimens are either irinotecan-based (IFL, FOLFIRI, AIO) or oxaliplatin-based (FOLFOX4, FOLFOX6).

Second-line chemotherapy treatment

Second-line regimens depend on which first-line regimens the patient already received. Patients who were treated with irinotecan-based regimens are commonly treated with a FOLFOX combination. Because of the lack of activity of single-agent oxaliplatin alone, use of this drug is recommended in combination with infusional 5-FU regardless of whether patients received infusional 5-FU as their first-line regimen.[63] Patients who had been treated with a FOLFOX-based regimen as part of their first-line regimen should receive irinotecan-based chemotherapy for second-line treatment. Treatment with irinotecan alone is reasonable in this situation because there are no data to support that the combination of irinotecan and 5-FU is superior to irinotecan alone in patients previously treated with 5-FU, and because irinotecan has single-agent activity in this setting.[34,36] However, the combination of irinotecan and infusional 5-FU should be considered in patients who received bolus 5-FU as their first-line treatment considering the trend towards superior activity of infusional 5-FU as compared to bolus regimen.[52]

The designations in PDQ that treatments are “standard” or “under clinical evaluation” are not to be used as a basis for reimbursement determinations.

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Stage 0 Colon Cancer

Stage 0 colon cancer is the most superficial of all the lesions and is limited to the mucosa without invasion of the lamina propria. Because of its superficial nature, the surgical procedure may be limited.

Treatment options:

1. Local excision or simple polypectomy with clear margins.
2. Colon resection for larger lesions not amenable to local excision.

Stage I Colon Cancer

Stage I (old staging: Dukes' A or Modified Astler-Coller A and B1)

Because of its localized nature, stage I has a high cure rate.

Treatment options:

- Wide surgical resection and anastomosis. The role of laparoscopic techniques [1-4] in the treatment of colon cancer is under evaluation in a multicenter prospective randomized trial comparing laparoscopic-assisted colectomy (LAC) to open colectomy.[5] The quality-of-life component of this trial has been published and reported minimal short-term quality-of-life benefits with LAC.[6] [Level of evidence: 1iiC]

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Stage II Colon Cancer

Stage II (old staging: Dukes' B or Modified Astler-Coller B2 and B3)

Treatment options:

1. Wide surgical resection and anastomosis. The role of laparoscopic techniques [1-4] in the treatment of colon cancer is under evaluation in a multicenter prospective randomized trial comparing laparoscopic-assisted colectomy (LAC) to open colectomy.[5] The quality-of-life component of this trial has been published and reported minimal short-term quality-of-life benefits with LAC.[4] [Level of evidence: 1iiC]
2. Following surgery, patients should be considered for entry into carefully-controlled clinical trials evaluating the use of systemic or regional chemotherapy, radiation therapy, or biologic therapy.[6,7] Information about ongoing clinical trials is available from the NCI Cancer.gov [11] Web site. Adjuvant therapy is not indicated for most patients unless they are entered into a clinical trial.

Adjuvant therapy

The potential value of adjuvant therapy for patients with stage II (Dukes' B or MAC B2 or B3) colon cancer also remains controversial. Although subgroups of patients with stage II colon cancer may be at higher-than-average risk for recurrence (including those with anatomic features such as tumor adherence to adjacent structures, perforation, complete obstruction, or with biologic characteristics such as aneuploidy, high S-phase analysis, or deletion of 18q),[8-10] evidence is inconsistent that adjuvant 5-fluorouracil (5-FU)-based chemotherapy is associated with an overall improved survival compared with surgery alone.[11] Investigators from the National Surgical Adjuvant Breast and Bowel Project have indicated that the reduction in risk of recurrence by adjuvant therapy in patients with stage II disease is of similar magnitude to the benefit seen in patients with stage III disease treated with adjuvant therapy, although an overall survival advantage has not been established.[12] A randomized trial of postoperative fluorouracil plus levamisole compared to surgery alone showed no survival advantage to postoperative adjuvant chemotherapy.[11] A meta-analysis of 1,000 stage II patients whose experience was amalgamated from a series of trials indicates a 2% advantage in disease-free survival at 5 years when adjuvant therapy-treated patients treated with 5-FU-leucovorin are compared to untreated controls.[13] [Level of evidence: 1iiDi];[14] Patients with stage II colon cancer remain candidates for clinical trials in which either surgery alone or 5-FU-leucovorin represent standard therapy.[15-17]

Improved outcomes with postoperative radiation therapy have been suggested in single-institution retrospective reviews for certain "high-risk" subsets of colon cancer patients (T3 or T4, tumor location in immobile sites, local perforation, obstruction, residual disease postresection).[18-23] A phase III randomized Intergroup trial designed to test the benefit of adding radiation therapy to surgery and chemotherapy with 5-FU-levamisole for selected high-risk colon cancer patients (T4, or T3N1-2 ascending/descending colon) [24] was closed early secondary to inadequate patient accrual, and preliminary analysis of 222 patients demonstrated no relapse or overall survival benefit for the group receiving radiation therapy.

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Stage III Colon Cancer

Note: Some citations in the text of this section are followed by a level of evidence. The PDQ editorial boards use a formal ranking system to help the reader judge the strength of evidence linked to the reported results of a therapeutic strategy. (Refer to the PDQ summary on Levels of Evidence [5] for more information.)

Stage III (old staging: Dukes' C or Modified Astler-Coller C1-C3)

Stage III colon cancer denotes lymph node involvement. Studies have indicated that the number of lymph nodes involved affects prognosis; patients with 1 to 3 involved nodes have a significantly better survival than those with 4 or more involved nodes.

Treatment options:

1. Wide surgical resection and anastomosis.

   The role of laparoscopic techniques [1-4] in the treatment of colon cancer is under evaluation in a multicenter prospective randomized trial comparing laparoscopic-assisted colectomy (LAC) to open colectomy.[5] The quality-of-life component of this trial has been published and reported minimal short-term quality-of-life benefits with LAC.[6] [Level of evidence: 1iiC]

   For patients who are not candidates for clinical trials, postoperative chemotherapy with fluorouracil (5-FU)-leucovorin for 6 months. Based on preliminary results from the MOSAIC trial presented at the American Society of Clinical Oncology meeting in 2003, adjuvant FOLFOX4 (oxaliplatin, leucovorin, 5-FU) demonstrated prolonged 3-year survival but did not demonstrate an overall survival advantage.[7]

2. Eligible patients should be considered for entry into carefully controlled clinical trials comparing various postoperative chemotherapy regimens which are now also including oxaliplatin-based and irinotecan-based chemotherapy with new targeted agents, postoperative radiation therapy, or biological therapy, alone or in combination.[8,9] Information about ongoing clinical trials is available from the NCI Cancer.gov [11] Web site.

Adjuvant therapy

Improved outcomes with postoperative radiation therapy have been suggested in single-institution retrospective reviews for certain "high-risk" subsets of colon cancer patients (T3 or T4, tumor location in immobile sites, local perforation, obstruction, residual disease postresection).[10-15] A phase III randomized Intergroup trial designed to test the benefit of adding radiation therapy to surgery and 5-FU-levamisole chemotherapy for selected high-risk colon cancer patients (T4, or T3N1-2 ascending/descending colon) [16] was closed early secondary to inadequate patient accrual, and preliminary analysis of 222 patients demonstrated no relapse or overall survival benefit for the group receiving radiation therapy. Intraoperative electron-beam radiation therapy, to the site of residual microscopic or gross residual disease following surgical extirpation, has also been reported to improve local control when combined with external-beam radiation therapy and chemotherapy.[15] [Level of evidence: 3iiiDi];[17] (Refer to the discussion of adjuvant therapy in the Treatment Option Overview section of this summary.)

In the late 1980s, a passive immunotherapy approach to adjuvant treatment of stage III colorectal cancer demonstrated encouraging results in a single randomized trial.[18] This trial compared postoperative administration of a murine monoclonal antibody to 17-1A antigen (MOAB 17-1A), a cell surface glycoprotein of uncertain function expressed on both normal and malignant epithelial cells, to surgery alone. Treated patients appeared to have a survival benefit comparable to that seen in adjuvant chemotherapy trials, with a relative reduction in mortality of 32% (95% confidence interval (CI), 8-51).[18] [Level of evidence: 1iiA] The small size of this trial, however, was associated with a wide CI for the

observed benefit and the result remains to be confirmed. Other adjuvant immunotherapeutic approaches, including autologous tumor vaccines,[19] are also under clinical evaluation.

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Stage IV and Recurrent Colon Cancer

Note: Some citations in the text of this section are followed by a level of evidence. The PDQ editorial boards use a formal ranking system to help the reader judge the strength of evidence linked to the reported results of a therapeutic strategy. (Refer to the PDQ summary on Levels of Evidence [5] for more information.)

Stage IV (old staging: Modified Astler-Coller D) and recurrent colon cancer

Stage IV colon cancer denotes distant metastatic disease. Treatment of recurrent colon cancer depends on the sites of recurrent disease demonstrable by physical examination and/or radiographic studies. In addition to standard radiographic procedures, radioimmunoscintography may add clinical information which may affect management.[1] Such approaches, however, have not led to improvements in long-term outcome measures such as survival.

Treatment options:

1. Surgical resection of locally recurrent cancer.
2. Surgical resection/anastomosis or bypass of obstructing or bleeding primary lesions in selected metastatic cases.
3. Resection of liver metastases in selected metastatic patients (5-year cure rate for resection of solitary or combination metastases exceeds 20%) or ablation in selected patients.[2-11]
4. Resection of isolated pulmonary or ovarian metastases in selected patients.
5. Palliative radiation therapy.
6. Palliative chemotherapy.
7. Surgical resection of isolated metastases (liver, lung, ovaries).[2-6,9,10,12]
8. Clinical trials evaluating new drugs and biological therapy.
9. Clinical trials comparing various chemotherapy regimens or biological therapy, alone or in combination.

Locally recurrent colon cancer

Locally recurrent colon cancer, such as a suture line recurrence, may be resectable.

Liver metastasis

Approximately 50% of colon cancer patients will be diagnosed with hepatic metastases, either at the time of initial presentation or as a result of disease recurrence. Although only a small proportion of patients with hepatic metastases are candidates for surgical resection, advances in tumor ablation techniques and in both regional and systemic chemotherapy administration provide for a number of treatment options.

For patients with hepatic metastasis considered to be resectable (based on limited number of lesions, intrahepatic locations of lesions, lack of major vascular involvement, absent or limited extrahepatic disease, and sufficient functional hepatic reserve), a negative margin resection has resulted in 5-year survival rates of 25% to 40% in mostly nonrandomized studies.[5,7,13-16] Improved surgical techniques and advances in preoperative imaging have allowed for better patient selection for resection.

For patients with hepatic metastases deemed unresectable, radiofrequency ablation has emerged as a safe technique (2% major morbidity, <1% mortality rates) that may provide for long-term tumor control.[17-22] Cryosurgical ablation [23-25] remains an option for patients with certain tumors not amenable to resection.

Other local ablative techniques that have been used to manage liver metastases include embolization and interstitial radiation therapy.[26,27] Patients with limited pulmonary metastases, and patients with

both pulmonary and hepatic metastases, may also be considered for surgical resection, with 5-year survival possible in highly-selected patients.[12,28,29]

The role of adjuvant chemotherapy after potentially-curative resection of liver metastases is uncertain. A trial of hepatic arterial floxuridine plus systemic fluorouracil (5-FU) plus leucovorin was shown to result in improved 2-year disease-free and overall survival (86% versus 72%, P=.03), but did not show a significant statistical difference in median survival, compared to systemic 5-FU therapy alone.[30] [Level of evidence: 1iiA] A second trial preoperatively randomized 109 patients who had 1 to 3 potentially resectable colorectal hepatic metastases to either no further therapy or postoperative hepatic arterial floxuridine plus systemic 5-FU.[31] Of those randomized, 27% were deemed ineligible at the time of surgery, leaving only 75 patients evaluable for recurrence and survival. While liver recurrence was decreased, median or 4-year survival was not significantly different. Further studies are required to evaluate this treatment approach and to determine whether more effective systemic combination chemotherapy alone may provide similar results compared to hepatic intra-arterial therapy plus systemic treatment.

Hepatic intra-arterial chemotherapy with floxuridine for liver metastases has produced higher overall response rates but no consistent improvement in survival when compared to systemic chemotherapy.[2,32-36] Controversy regarding the efficacy of regional chemotherapy has led to initiation of a large multicenter phase III trial (CLB-9481) of hepatic arterial infusion versus systemic chemotherapy. The use of the combination of intra-arterial chemotherapy with hepatic irradiation, especially employing focal radiation of metastatic lesions, is under evaluation.[37] Several studies show increased local toxic effects with hepatic infusional therapy, including liver function abnormalities and fatal biliary sclerosis.

Other drug combinations described in this section:

- AIO regimen (folic acid, 5-FU, irinotecan):
    - Irinotecan (100 mg/m^2) as a 2-hour infusion day 1; leucovorin (500 mg/m^2) as a 2-hour infusion day 1; followed by 5-FU (2,000 mg/m^2) intravenous (IV) bolus via ambulatory pump over 24 hours weekly x 4 every 52 weeks.
- Douillard regimen (folic acid, 5-FU, irinotecan):
    - Irinotecan (180 mg/m^2) as a 2-hour infusion day 1; leucovorin (200 mg/m^2) as a 2-hour infusion days 1 and 2; followed by a loading dose of 5-FU (400 mg/m^2) IV bolus, then 5-FU (600 mg/m^2) via ambulatory pump over 22 hours days 1 and 2 every 2 weeks.
- FOLFOX4 regimen (oxaliplatin, leucovorin, 5-FU):
    - Oxaliplatin (85 mg/m^2) as a 2-hour infusion day 1; leucovorin (200 mg/m^2) as a 2-hour infusion days 1 and 2; followed by a loading dose of 5-FU (400 mg/m^2) IV bolus, then 5-FU (600 mg/m^2) via ambulatory pump over 22 hours days 1 and 2 every 2 weeks.
- FOLFOX6 regimen (oxaliplatin, leucovorin, 5-FU):
    - Oxaliplatin (85-100 mg/m^2) as a 2-hour infusion day 1; leucovorin (400 mg/m^2) as a 2-hour infusion day 1; followed by a loading dose of 5-FU (400 mg/m^2) IV bolus on day 1, then 5-FU (2,400-3,000 mg/m^2) via ambulatory pump over 46 hours every 2 weeks.
- FOLFIRI regimen (folic acid, 5-FU, irinotecan):
    - Irinotecan (180 mg/m^2) as a 2-hour infusion day 1; leucovorin (400 mg/m^2) as a 2-hour infusion day 1; followed by a loading dose of 5-FU (400 mg/m^2) IV bolus on day 1, then 5-FU (2,400-3,000 mg/m^2) via ambulatory pump over 46 hours every 2 weeks.
- IFL (or Saltz) regimen (irinotecan, 5-FU, leucovorin):
    - Irinotecan (125 mg/m^2), 5-FU (500 mg/m^2) IV bolus, and leucovorin (20 mg/m^2) IV bolus weekly for 4 out of 6 weeks.

First-line chemotherapy treatment

In stage IV and recurrent colon cancer, chemotherapy has been used for palliation. Combinations of 5-FU and leucovorin with irinotecan (FOLFIRI, AIO, IFL) or oxaliplatin (FOLFOX4, FOLFOX6) are considered to be standard.

A randomized study of first-line treatment for advanced colorectal cancers compared IFL to 5-FU (425 mg/m^2 daily times 5 days) administered with leucovorin (20 mg/m^2 daily times 5 days consecutively every 4 weeks).[38] The IFL regimen demonstrated significantly longer progression-free survival (7.9 versus 4.3 months, P=.004), a higher response rate (39% versus 21%, P<.001), and prolonged overall survival (median 14.8 months versus 12.6 months, P=.04).

Another trial compared irinotecan, using the Douillard or AIO regimen, with infusional 5-FU and leucovorin using the same schedule. The patients receiving the irinotecan-based IFL treatment demonstrated significantly longer time-to-progression (median 6.7 months versus 4.4 months, P<.001), a higher response rate, and a higher overall survival (median 17.4 versus 14.1 months, P=.031). On the basis of these randomized trials, these 3 regimens are licensed for use in the United States as first-line therapy.

The toxic effects of the IFL regimen became a matter of some concern in 2001 when 2 randomized, National Cancer Institute (NCI)-sponsored trials, 1 in advanced disease and 1 in the adjuvant setting for stage III colon cancer, each demonstrated a higher 60-day death rate in the IFL arms.[39] Subsequent analyses suggested that such toxic effects may be characteristic of regimens based on bolus 5-FU, whether or not they incorporate irinotecan. Nonetheless, the issue of toxic effects with bolus IFL has necessitated careful consideration of patient eligibility for this approach, balancing the trade-offs inherent in this type of combination chemotherapy, and close patient follow-up and management of early signs of side effects.

First-line chemotherapy studies also tested the combinations of oxaliplatin with 5-FU and leucovorin in patients with advanced colorectal cancer. One study compared the FOLFOX4 regimen to the same regimen of infusional 5-FU and leucovorin without oxaliplatin in patients with advanced colorectal cancer. Patients treated with FOLFOX4 had a significantly longer progression-free survival (8.2 months versus 6 months) and response rate (51% versus 22%), but no improvement in overall survival.[40] Similar results were observed in a second randomized trial using a chronomodulated schedule.[41] Based on these results, the FOLFOX4 regimen was approved for first-line treatment of patients with advanced colorectal cancer in Europe and other countries.

The next generation of studies compared irinotecan-based and oxaliplatin-based chemotherapy in patients with newly-diagnosed advanced colorectal cancer. The V308 study conducted by the GERCOR group compared FOLFOX6 with FOLFIRI in patients with advanced colorectal cancer.[42] In this study, patients were crossed-over from 1 regimen to the other at the time of progression. These 2 first-line treatments for metastatic and advanced colorectal cancer have demonstrated similar response rates and acceptable toxic effects profiles with no differences in median time-to-first progression (8 months versus 8.5 months) or overall survival (20.6 months versus 21.5 months) for FOLFOX6 followed by FOLFIRI regimen versus FOLFIRI followed by FOLFOX regimen, respectively.

The US Cooperative Groups completed a randomized intergroup clinical trial sponsored by NCI for the initial treatment of advanced colorectal cancer.[43] This trial was originally launched to compare the IFL regimen, the FOLFOX4 regimen, and several other regimens to the previous standard Mayo 5-day bolus 5-FU/leucovorin regimen. When the randomized data became available demonstrating superiority of IFL over the Mayo regimen [38] and IFL was approved, the intergroup study (N9741) was modified to a 3-arm trial with the Mayo regimen dropped (along with several other arms) and IFL is now the standard arm. The FOLFOX4 regimen and a combination of oxaliplatin and irinotecan were compared in this study.[44]

A planned interim analysis of N9741 was performed in April 2002 and prespecified stopping boundaries were crossed in the comparison between IFL and FOLFOX (but not in comparisons involving the oxaliplatin-irinotecan arm). A total of 795 patients were randomized among the different study arms. With a median follow-up of 20.4 months, all outcome measures for patients receiving FOLFOX4 were significantly better than for those receiving the standard IFL regimen, including a significantly better time-to-tumor progression for FOLFOX4 compared to IFL (8.7 months versus 6.9 months; P=.0014), higher response rates (45% versus 31%; P=.002), and improved overall survival (19.5 months versus 15 months; P=.0001). Patients treated with irinotecan and oxaliplatin (IROX) had a significantly lower median time-to-progression (6.5 months) and response rate (35%) compared to FOLFOX4 (P=.001 and P=.03, respectively); median survival, however, did not differ significantly between the 2 regimens (19.5 months versus 17.4 months, P=.09).[45]

The results of this study establish the FOLFOX4 regimen as a first-line treatment option in advanced colorectal cancer that is at least as effective, and perhaps more so, than others available. The N9741

study, however, cannot be considered definitive because of asymmetry in availability of potentially effective second-line therapy for patients on this trial. Whereas most patients who did not respond or stopped responding to FOLFOX4 would have access to irinotecan alone or in combination (and about half did receive it), oxaliplatin was not commercially available in the United States at that time, so only a minority of patients coming off the IFL arm because of progression received this agent. This means that the difference in overall survival observed in N9741 may have been somewhat magnified by differential access to effective second-line treatment. The progression-free survival, response rates, and toxic-effects outcomes also favored the FOLFOX4 regimen, however, and these would not have been affected by this issue of second-line treatment.

Based on these data, recommended first-line regimens for patients with advanced colorectal cancer include FOLFOX4, FOLFOX6, FOLFIRI, Douillard, and AIO.

Second-line chemotherapy treatment

Treatment of patients who progress after first-line chemotherapy is guided by which treatment was used for first-line treatment. Patients who were treated with a FOLFOX-based regimen should be treated with an irinotecan-based regimen and patients who already received an irinotecan-based regimen should be treated with a FOLFOX-based regimen.

The data from the GERCOR V308 study showed a 15% response rate and 4.5 months median progression-free survival in patients who progress to FOLFIRI chemotherapy when treated with FOLFOX, and a 4% response rate and 2.5 months median progression-free survival for the reverse sequence.[42] Treatment with FOLFOX was found superior in response rate (9.6%) to oxaliplatin (1.1%) and 5-FU-leucovorin (0.7%) alone in the EFC4584 phase III study.[46] Mature data from this study, however, failed to show a statistically significant improvement in median survival (9.8, 8.1, and 8.7 months, respectively, P=.07). Toxic effects, particularly neutropenia and neuropathy were higher in the FOLFOX arm.[47] Whether these results applied to patients who have received first-line irinotecan-based chemotherapy, which is the most common situation, is not known.

For patients who are clinically unlikely to tolerate aggressive combination chemotherapy, or who have unacceptable pre-existing comorbid disease, an infusional single-agent 5-FU-based regimen without either oxaliplatin or irinotecan remains a reasonable treatment option.[40] A phase III trial (GERCOR C96.1) demonstrated that infusional 5-FU-leucovorin administered on the same schedule as that used in the Douillard regimen was less toxic and more active in terms of response rate and progression-free survival than low-dose bolus daily times 5 days 5-FU-leucovorin in patients with advanced or metastatic colorectal cancer.[48]

New therapies and combinations

At the American Society of Clinical Oncology 2003 meeting, the results of 2 randomized trials incorporating novel therapies in patients with colorectal cancer were presented. The results of a randomized trial were presented that compared IFL-placebo with IFL-bevacizumab, a monoclonal antibody, against the vascular endothelial growth factor receptor in 925 patients with advanced colorectal cancer. Bevacizumab was administered at a dose of 5 mg/kg every other week. The median progression-free survival of patients treated with IFL plus bevacizumab was 10.6, versus 6.2 months (P=.00001) for patients treated with IFL and placebo, and the median overall survival was 20.3 versus 15.6 months (P=.00003), respectively. Overall response rates were also superior for the bevacizumab-containing regimen (44.9 versus 34.7%, P=.029). Patients treated with bevacizumab and IFL had a higher overall incidence of grade 3 to 4 toxic effects (85% versus 74%, P<.01).[49]

The second study compared cetuximab, a monoclonal antibody, alone or in combination with irinotecan in 329 patients with irinotecan-refractory colorectal cancer. Patients treated with the combination regimen had a significantly higher response rate of 22.9% compared to 10.8% for patients treated with cetuximab alone (P=.0074) and a longer time to treatment failure (4.1 months versus 1.5 months, P<.0001), but there was no significant improvement in median survival between arms.[50]

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Appendix 3

R&M Summary Statement May 2004 – Action Items

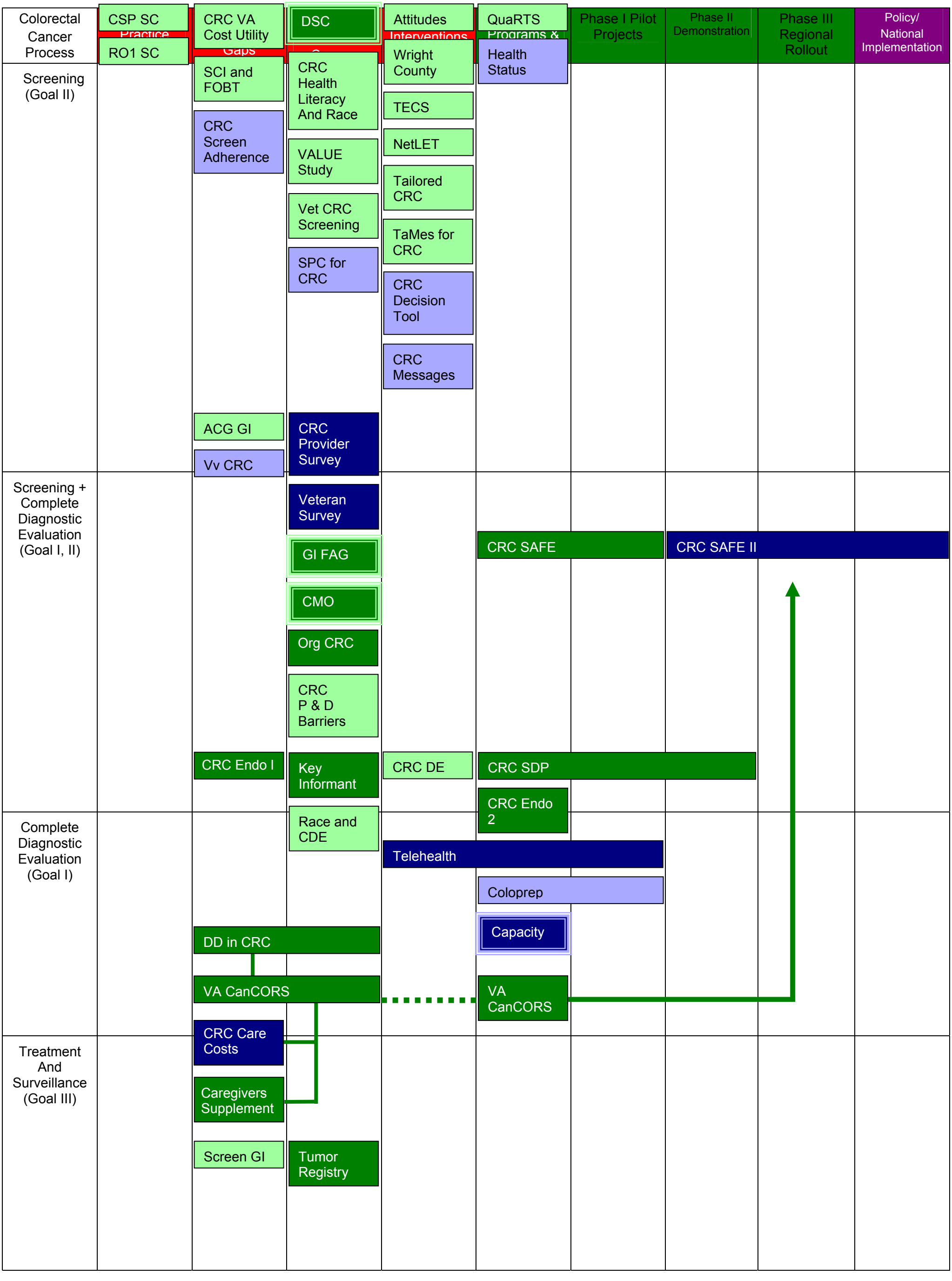
The CRC QUERI Executive Committee and Coordinators thank the R&M Committee for their insightful review and offer the following responses to action items:

1) CRC QUERI should focus on short-term studies and rapid improvement, even if evidence regarding barriers and facilitators is not complete, in order to have short-term successes with impacts….
    a. We agree. CRC QUERI is currently advancing an aggressive strategy of translating research methodology, as well as findings, to improve clinical practice. For example, we have proposed a performance monitoring and feedback system based on CRC-SAFE and CanCORS methods to OQP and PCS. Such systems have been shown (in other clinical settings) to have a profound impact on provider, staff and management behavior, even when behavior drivers are not understood.
    b. We have invested heavily in projects that combine intervention trial methodology with implementation research to reduce the program development cycle time (see projects CRC SDP, Telehealth, Coloprep).
    c. We are leveraging our working relationships with clinical and operations partners to provide rapid-response technical assistance and needs assessment (see projects GI FAC, CMO, Capacity).
    d. We are working with reviewers and policy makers to understand and support the need for funding support, rapid review mechanisms and other "system alignment" policies necessary to move the QUERI agenda forward (see contributions to State of the Art Conference on Implementation under "Impacts").
    e. It is important to note that colorectal cancer is a low base rate, slowly advancing disease. Despite the fact that it is a high burden disease within the VA, providing definitive scientific evidence of morbidity and mortality reduction will take considerable time. For example, the "Minnesota Colon Cancer Control Study" which definitively determined the value of colorectal cancer screening had a 25-year follow-up period. This is obviously unacceptable for QUERI. Our main outcomes will be in our impact on clinical practices which should lead to long-term mortality and morbidity reduction.
2) The primary emphasis for this QUERI should be on screening, stage migration and follow up.

a. Based on systematic review of VA practices and performance gaps, we assert that our primary goal is to improve the follow-up of patients with positive screening test results. OQP estimates show that primary care screening rates are well above the national average (currently at 74%) while follow up of positive screens is less than 46%. It is unethical and inefficient to attempt to increase screening until barriers to CDE are addressed.
b. Data regarding stage migration must be obtained from the VA Cancer Registry. To date the registry has not entered into the necessary data use agreements with the QUERI, QUERI-sponsored projects, or the congressionally-mandated Oncology GPRA review. Recent negotiations with PCS and the cancer registrar indicate that this situation may be resolved within this fiscal year. We will add stage migration to our tracer variables as soon as possible.

3) CRC QUERI should discuss how they will use their data from CanCORS and whether the data will be made available to others.
    a. Data from CanCORS will be available to others beginning in FY2006. As members of a national research consortium, we are bound by the policies that apply to the consortium as a whole.
    b. The data will provide a comprehensive picture of the state of colorectal and lung cancer detection and care in the VA. Deviations from the current standard of care will be identified, providing the opportunity to develop programs to address deficiencies.
    c. The CRC QUERI is not waiting for CanCORS findings to act on lessons learned from this program. We have developed performance monitoring tools based on CanCORS methodology. We are working with OQP and PCS to implement these tools across the VA.

Figure 1. Colorectal Cancer QUERI Research/Implementation Pipeline



Light Blue – Affiliate Planned Projects
Dark Blue – QUERI Core Planned Projects
Light Green – Affiliate Active and Completed Projects
Dark Green – QUERI Core Active and Completed Projects
Border Design – Rapid Response to Stake Holder Request

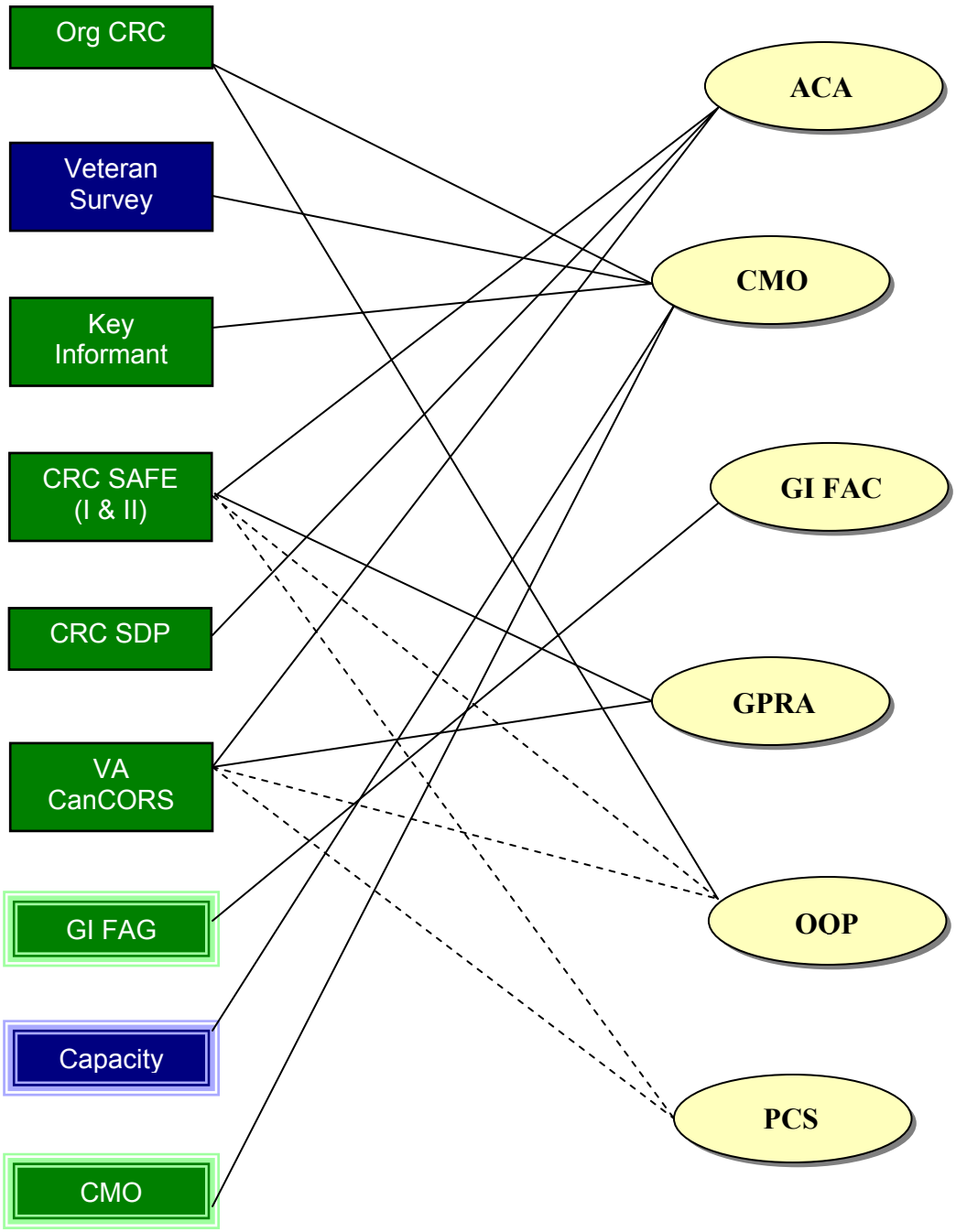


Figure 2. Stakeholder interactions and key CRC QUERI projects. Interactions range from data sharing, such as the the ORG CRC project's use of OQP data, technichal assistance from QUERI to stakeholders (ACA, CMO, GI FAC, etc) to more in-depth conceptual partnerships. For example, the sampling plan for the CRC Veteran Survey was informed by data collected by the CMO workgroup. In turn, the Veteran Survey includes items of interest to the CMOs which they did not learn from their own needs assessment. Key: ACA = Advanced Clinic Access, CMO = VISN-level CMO/QMO workgroup, GI FAC = GI Field Advisory Committee an arm of the Acute Care Strategic Health Group, GPRA = External review of VA oncology practices conducted under the auspices of the Government Performance and Results Act, OQP = Office of Quality and Performance, PCS = Patient Care Services. Green boxes indicate active and completed projects, blue boxes indicate planned projects, bold outlines indicate rapid response projects undertaken at stakeholder request.

Figure 3. CRC QUERI Conceptual Model

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